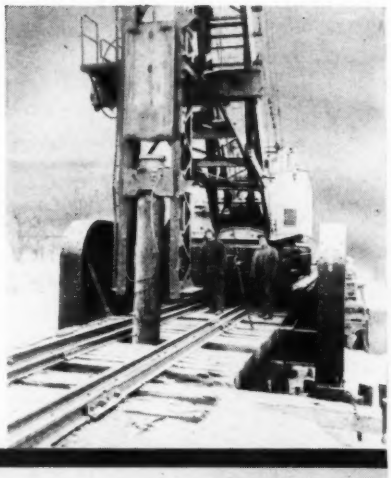
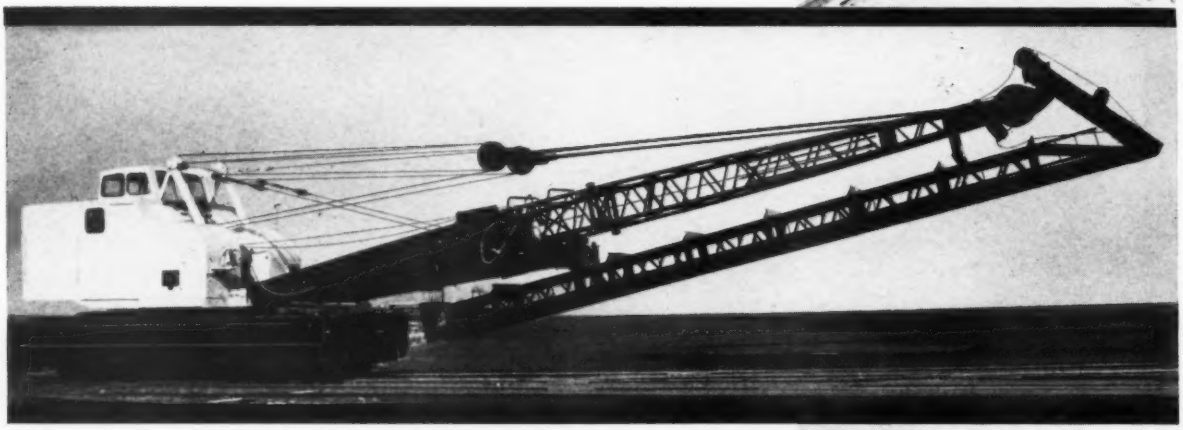
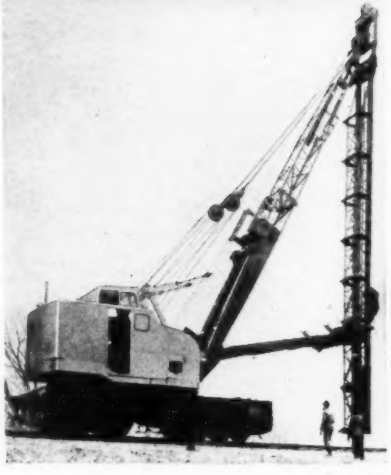
LATEST TYPE BROWNHOIST DIESEL ELECTRIC PILE DRIVER AT WORK FOR AMERICA'S RAILROADS





BROWNHOIST DIESEL ELECTRIC PILE DRIVERS HAVE THE SPEED TO GET OFF MAIN LINES QUICKLY, AND THE LONG LEADERS AND FULL CIRCLE ROTATION TO WORK IN ANY POSITION

Propelled by electric travel motors, these Industrial Brownhoist machines are capable of road speeds up to 18 miles per hour . . . they get on and off main lines in a hurry. Strut and leaders fold away for travel, allowing full railroad clearance, and they're quickly and easily fastened in upright position for battering. The Brownhoist rotates in a full circle, and its leader reach of 28'6" from center of rotation gives it a wide working range. A large Diesel engine supplies the power for the heavy-duty Brownhoist machine. It has a maximum leader load of 26,000 pounds, and is equipped with power battering to sink piles as large or larger than that shown in the upper photograph. For further information about Diesel Electric Pile Drivers or other heavy-duty materials handling equipment, write today for your copy of the new Industrial Brownhoist catalog.



189

BROWNHOIST

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, San Francisco, Montreal
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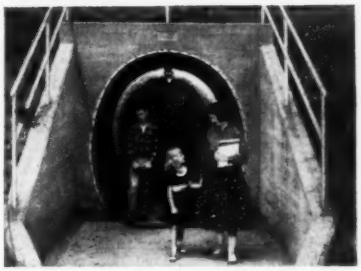
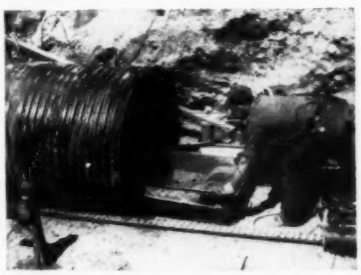
Putting a "Hole" Through a Railroad Fill?

Near Bonners Ferry, Idaho, the Great Northern's main line track extends along a river that sometimes floods lowlands on the other side of the fill. Supplementing an inadequate small culvert, this Armco Liner Plate structure was installed to quickly equalize water levels and minimize danger of washouts.

Liner Plate forms railroad underpass for school children.



Armco Pipe as utility conduit is being jacked through fill.



MULTI-PLATE Pipe installed for drainage under new railroad.

You can do it quickly and easily with a durable Armco metal product

It often happens that a tunnel, conduit or underpass is required through a railroad fill. Usually, the best solution is an Armco Liner Plate structure. The reason? Pound-for-pound, Armco Liner Plates are the strongest made. And the installation can be made without disturbing the safety and movement of surface traffic.

Assembly is simple; all bolting is from within the structure. One man can carry, handle and install plates. Installation keeps pace with excavation. Armco Liner Plates are supplied in a wide selection of sizes and shapes.

Depending on conditions and size requirements, Armco Corrugated Metal Pipe or MULTI-PLATE® Pipe may also be utilized for tunnels or conduits through railroad fills. Installation may be open-cut, or by jacking. Wide range of sizes.

These structures may be installed by railroad forces. Or can be handled as a complete installation through Armco's construction facilities.

* * *

These structures represent just one group in the more than 30 Armco products for engineering construction. Fill in and mail the coupon for more data. Armco Drainage & Metal Products, Inc., 5848 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

Armco Drainage & Metal Products, Inc.
5848 Curtis Street, Middletown, Ohio

☐ Send my copy of "Manual of Tunnels, Underpasses and Conduits"

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in this issue:

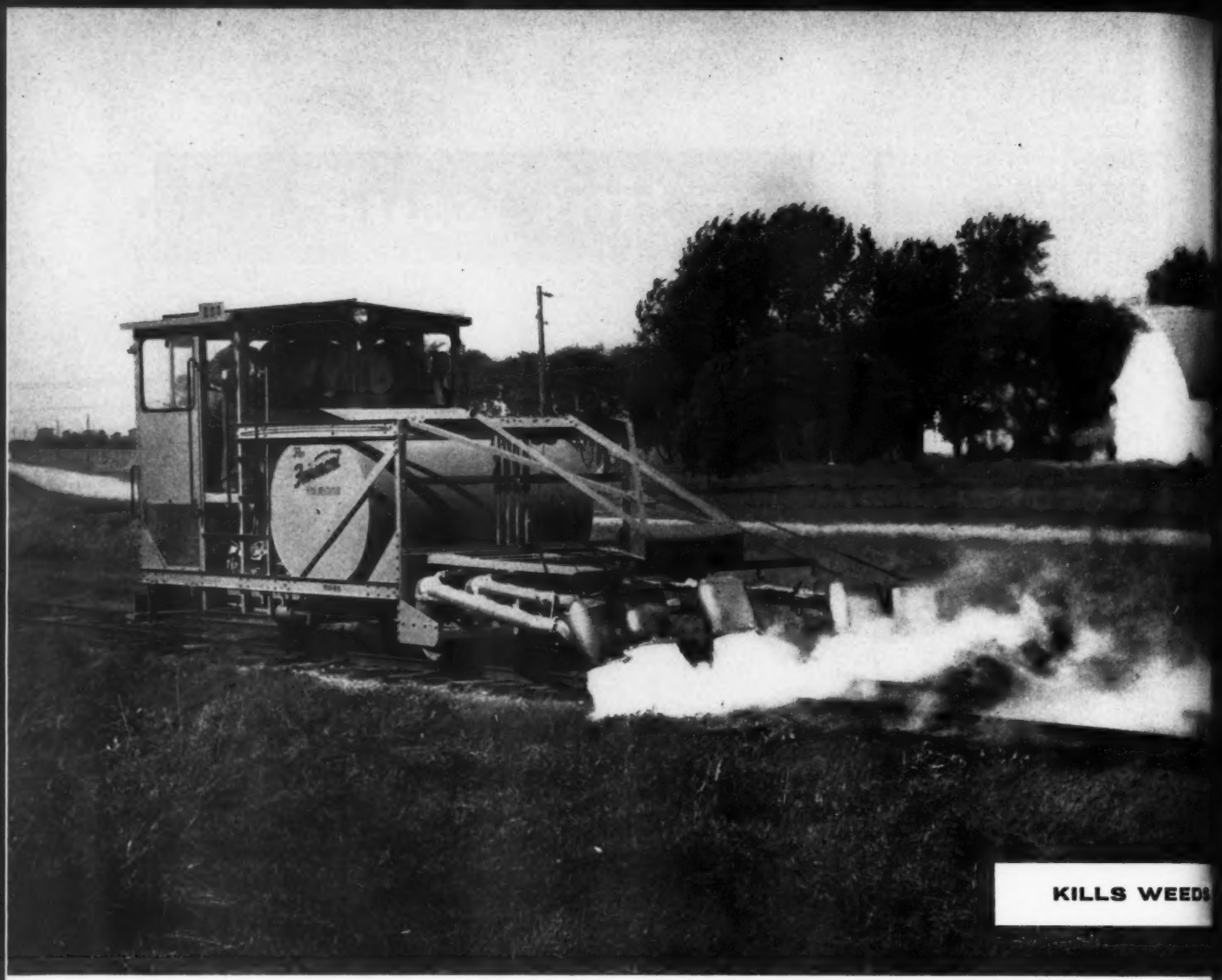
vol. 54, no. 12 DECEMBER, 1958

DEPARTMENTS

DON'T MISS . . .

There's a new spirit and a new driving force behind the efforts of the Chicago & North Western to reduce costs through efficiency. The story of the resulting accomplishments by its M/W department is so big that the entire issue will be devoted to its telling.

. . . in the January issue

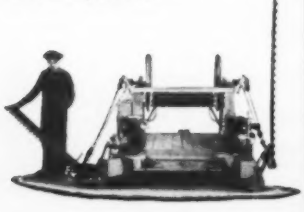


FAIRMONT

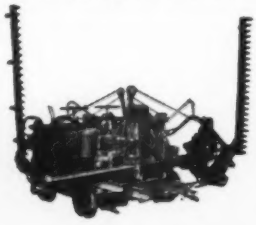
Works all year 'round—kills weeds, melts snow!

Simple and practical, THE FAIRMONT W55 WEED BURNER serves two purposes with maximum efficiency and minimum expense. In winter the W55 melts snow, even 20″ of snow in 30° below zero weather! It does the work of 50 to 75 men in a large yard, keeps switches clear and trains operating. In other seasons the W55 kills weeds in a solid 20′ width of track, or 8′ on each shoulder, at about 4 MPH. Burning is the most economical means of having clean yards and main lines. Four of the five burner heads are swing-type with hydraulic controls operated from the cab. Each burner head is fitted with three atomizing nozzles. The multi-range drive has two-range torque converter and delivers six speeds both forward and reverse. Save time and money—investigate now.

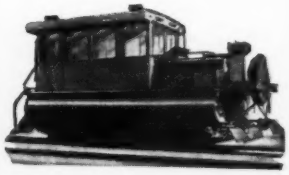
M5 SERIES A WEED MOWER is a sturdy unit with simplified controls. Equipped with automatic cutter bar release. With extensions it reaches 12 feet beyond rail.



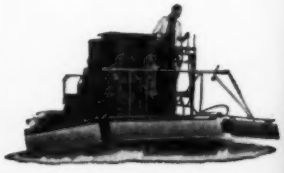
W24 SERIES A WEED MOWER gives close mowing due to accurate hydraulic control. Hydraulic sickle drive for smooth operation. Has safety sickle release, second swath extensions.

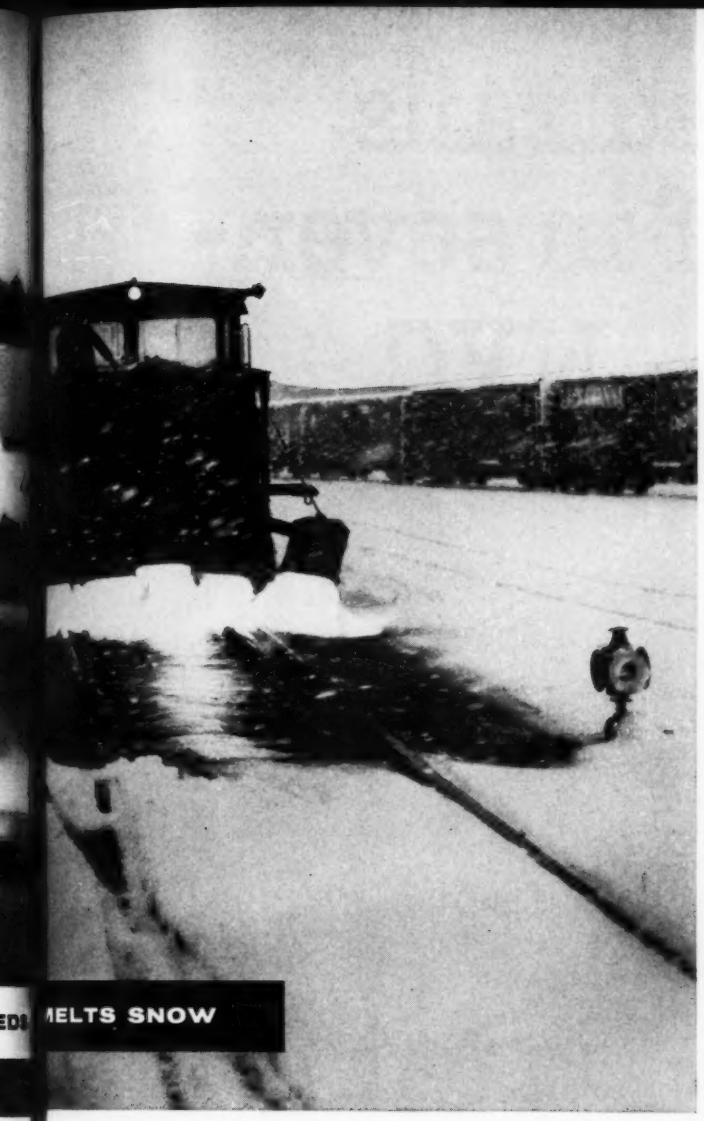


W66 SERIES B WEED SPRAYER is a complete, self-propelled unit with a variable spray rate. A single machine gives maximum availability and, moreover, it is highly maneuverable.



W78 SERIES B WEED SPRAYER has quality spray equipment on a low-cost trailer type machine. Excellent for branch lines, short lines, and yard tracks. Easy to operate.





Helps from Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

CAR HEATING EQUIPMENT. The Perfection line of infra-red heating equipment for thawing frozen bulk material in railroad cars is explained and illustrated in a 20-page booklet. Several case histories, with drawings, are included, showing typical installations using this type of equipment. A reprint of a magazine article explains how the principle works at a large railroad coal dock. A cost comparison with another type also used at this facility is given. The booklet also contains specifications and details of the various models of car heating equipment available. (Write: *Hewitt-Robins, Inc., Dept. RTS, 666 Glenbrook Rd., Stamford, Conn.*)

CLEANING EQUIPMENT. The complete line of Ace industrial and commercial cleaning equipment is described in a new brochure now available. Illustrated and explained is the full range of hand-portable models, industrial tank cleaners and commercial-model cleaners. Specifications for each model shown are included. A list of attachments and optional equipment is given. Also included is a list of optional equipment for special cleaning jobs. Other Ace industrial products available are illustrated and briefly described. (Write: *Ace-Sycamore, Inc., Dept. RTS, 448 Dekalb Ave., Sycamore, Ill.*)

SKYLIGHT PRODUCTS. The 1959 issue of the Marcolite annual catalog is now available. The 11-page booklet contains current information concerning the complete line of aluminum and fiberglass skylight products. Material contained in previously issued literature is consolidated in the catalog. Specifications, design data, construction features and model numbers are explained and illustrated for the manufacturer's skylights, roof panels and special and mass produced products. Special shapes available are also shown. Included are pictures showing several large buildings in which these products were utilized. (Write: *The Marco Company, Dept. RTS, 45 Greenwood Ave., East Orange, N. J.*)

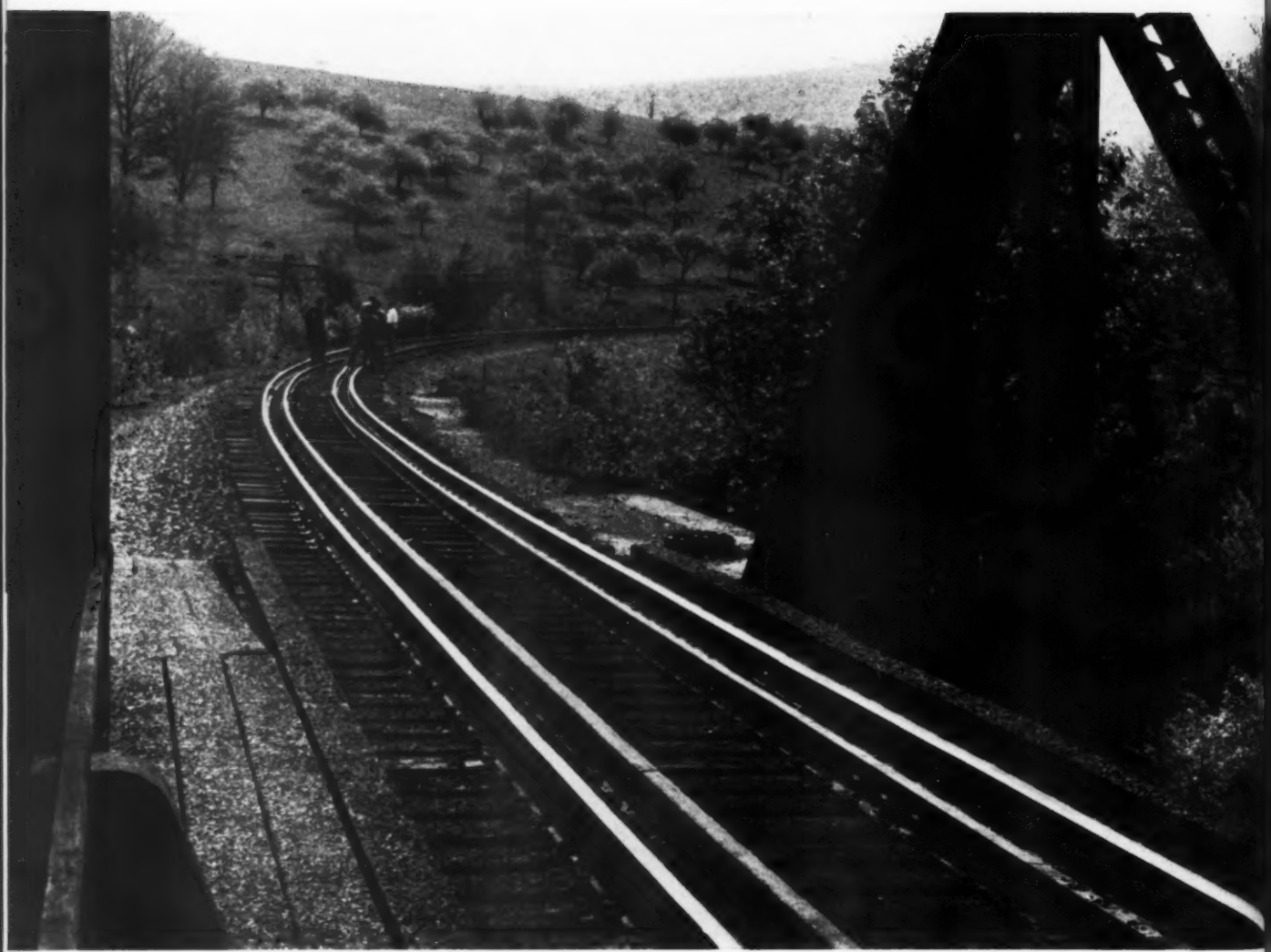
AIR COMPRESSORS. A 4-page bulletin is now available which describes the new LeRoi rotary portable air compressors. Designated P-121B, the bulletin illustrates and explains features of the 365RD2 air compressor. General specifications are also included. (Write: *LeRoi Division, Westinghouse Air Brake Company, Sales Promotion Department, Dept. RTS, Milwaukee 1, Wis.*)

RADIANT HEATERS. The Chromalox line of electric radiant comfort heaters is described and illustrated in a new booklet. Bulletin F-1614 explains the Far-Infrared principle used in the heaters and illustrates and explains typical problems relating to both large-area heating and spot heating. The four-page booklet covers the new ceiling type heater as well as the angular-mounted model. Included are descriptions of the various types of controls available. A guide for selecting the correct heaters and controls for different conditions is presented. (Write: *Edwin L. Wiegand Company, Dept. RTS, 7500 Thomas Blvd., Pittsburgh 8, Pa.*)

MOBILE CRANES. The superstructure of the Lorain 107 crane is described and illustrated in a new catalog. The 12-page catalog shows the 7 to 8-ton crane, which is mounted on a commercial carrier, in a variety of job applications. Features of the machine are explained. Conversion to shovel, dragline, clamshell, or hoe is pointed out. (Write: *The Thew Shovel Company, Dept. RTS, Lorain, Ohio.*)

FLOOR CLEANING EQUIPMENT. A new 20-page catalog describes and illustrates the complete line of Geerpres floor-cleaning equipment. Catalog 958 shows the evolution of the manufacturer's mop wringers, culminating in its interlocking-gear model. Pointed out are the staggered-tooth design and eleven other features of its wringer line. Also shown are caster-mounted buckets, mopping outfits and a wide range of mopping accessories, including the Jet Streem mop washer. A page is devoted to the proper care of mop wringers. Included are pictures and a description of the new Des-Kart which can be used to move desks or other heavy furniture. (Write: *Geerpres Wringer, Inc., Dept. RTS, P. O. Box 658, Muskegon, Mich.*)

Heat-treated rails cut wear in half in seven-year test on NYC



Viewed through the north-end trusses of New York Central's Bridge No. 138, near Cedar Run, Pa., the track spirals into a 411-ft curve of 7 degrees 51 minutes. The rails in this curve were laid in July 1950 to test comparative abrasion-resistance under bruising traffic conditions.

By the time this photograph was taken, nearly 8 years later, some 142,500,000 gross tons of traffic had ground their way through the curve. Surely an adequate load to provide significant patterns of curve-wear on the railheads!

The results? In a nutshell, Bethlehem heat-treated rails outperformed the standard rails in the test by about 2 to 1. The contour drawings (opposite page) tell better than words what happened in the case of two standard control-cooled rails and two heat-treated control-cooled rails at each end of the curve. In addition to the superior abrasion-resistance of heat-treated rail on the high side, note the comparisons of crushing on the low-side rails.

Superior performance like this means a healthy slash in maintenance of way costs. Truly, here is an outstanding opportunity to save real money!

We can cite many additional cases where heat-treated rails have proved their worth on leading roads across the country, in abrasion-resistance, resistance to shelling and resistance to plastic flow. We shall welcome the opportunity to go over these cases with you in detail. Just contact our nearest sales office or write directly to us at Bethlehem, Pa. You'll hear from us promptly.

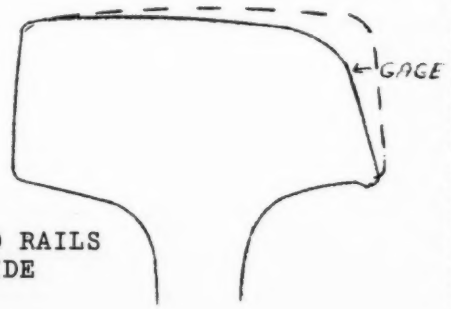
ACTUAL CONTOUR DRAWINGS OF RAILS AT CURVE NO. 242

New York Central System—May 22, 1958

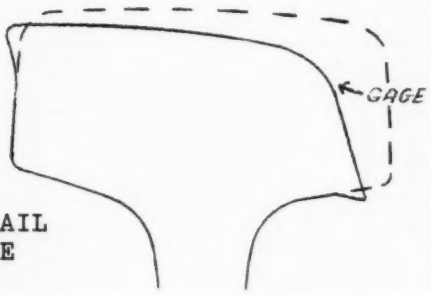
(about 3/4 actual size)

Section 127-DY

ORTH END TEST

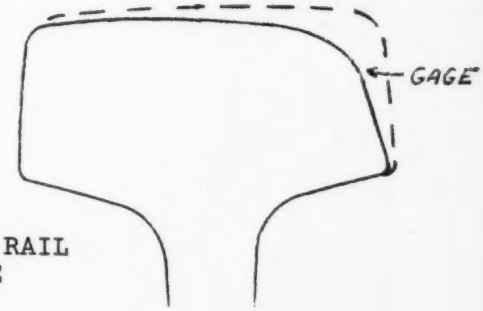


T-TREATED RAILS
HIGH SIDE

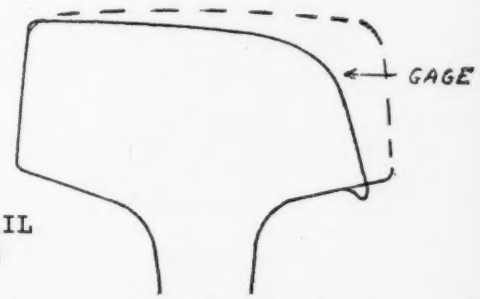


STANDARD RAIL
HIGH SIDE

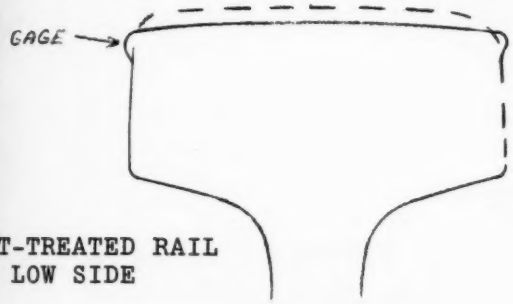
SOUTH END TEST



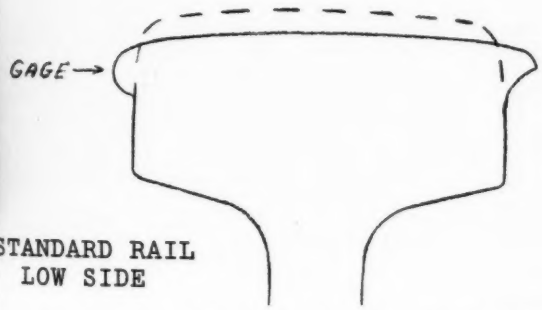
HEAT-TREATED RAIL
HIGH SIDE



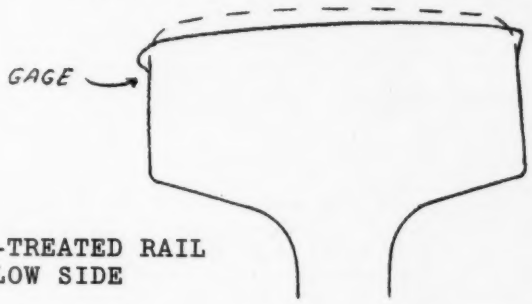
STANDARD RAIL
HIGH SIDE



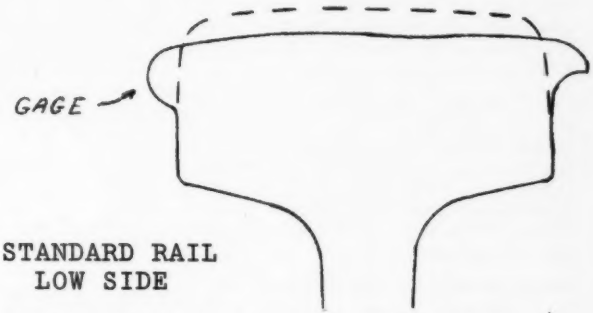
AT-TREATED RAIL
LOW SIDE



STANDARD RAIL
LOW SIDE



HEAT-TREATED RAIL
LOW SIDE



STANDARD RAIL
LOW SIDE

If you're interested in learning about Bethlehem's heat-treatment experience and facilities, write for Catalog 379, "Bethlehem Heat-Treated Trackwork."

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

RAILWAY TRACK and STRUCTURES

News about people

CANADIAN PACIFIC — N. B. Roberts, district engineer at North Bay, Ont., has been appointed assistant regional engineer, Eastern Region, at Toronto, Ont., succeeding **T. W. Creighton,** who has been promoted to regional engineer, maintenance of way, there. Mr. Creighton succeeds **G. W. Miller,** who has been appointed general superintendent of the Ontario district at Toronto. **R. W. Webb,** division engineer, Woodstock, N. B., has been transferred to the Farnham division of the Quebec District, succeeding **J. A. Shearer,** transferred. **J. E. Reynolds,** division engineer at Brownville Jct., Me., has been transferred to the Montreal Terminals division, succeeding **A. K. Roundtree.**

CHICAGO & WESTERN INDIANA — BELT OF CHICAGO — A. B. Hillman, Jr., engineer maintenance of way, Chicago, has been appointed assistant chief engineer. He will retain responsibility over maintenance of way and structures. The duties of **W. D. Chapel,** assistant engineer, are extended to include supervision of maintenance of way and structures as delegated.

FRISCO — B. E. Buterbaugh, assistant superintendent, construction, at Tulsa, Okla., has been appointed construction engineer at the same location.

ILLINOIS CENTRAL — E. E. Brown, track inspector, has been appointed supervisor track on the Iowa division at Freeport, Ill., succeeding **H. D. Leroy,** transferred to the St. Louis division at East St. Louis. Mr. Leroy succeeds **M. L. Atkins** who has been appointed assistant to division engineer of the St. Louis division at Carbondale, in place of **R. B. Birkett,** promoted to division engineer on the Iowa division, Lines West, at Waterloo, Iowa, succeeding **M. B. Davis,** retired. **J. C. Duncan,** general foreman track, has been promoted to supervisor track on the Springfield division at Clinton, succeeding **C. F. Brooks,** retired.

B. G. Sykes, assistant supervisor track on the Memphis division, has been appointed supervisor track at Durant, Miss., succeeding **E. J. Dean,** who has been transferred to Gibson City, Ill. Mr. Dean replaces **F. J. Fortino,** who has been transferred to Champaign, Ill., succeeding **O. A. Stewart,** deceased.

JERSEY CENTRAL — John J. Maloney has been appointed master carpenter and bridge inspector on the Southern division, succeeding **Frederick C. Schweizer,** deceased. He has also been appointed master carpenter for the New York & Long Branch.

MAINE CENTRAL — Wilhelm G. Schloth, assistant track supervisor on the Boston & Maine, has been appointed to the same position on the Maine Central at Brunswick, Me., succeeding **Horace Ames,** who has been promoted to track supervisor at that location. Mr. Ames replaces **William L. Harris III,** who has been transferred to Lewiston, Me., to succeed **Lloyd F. Breen,** retired. **David C. Eldridge,** assistant track supervisor on the B&M, has been appointed to the same position on the Maine Central at Waterville, Me., succeeding **Fred Sautter,** who has resigned to join Fairmont Railway Motors, Inc., as announced elsewhere in this issue.

NEW YORK CENTRAL — Consolidation of the Mohawk and St. Lawrence division has been announced with headquarters at Utica, N. Y. **G. Auer** has been appointed division engineer of the consolidated division with **T. E. Burrell** as assistant division engineer, both at Utica, and **C. C. Lathey** as assistant division engineer at Watertown. Consolidation of the Pennsylvania division with the Syracuse division has also been announced with headquarters at Syracuse, N. Y. **C. A. Maxeiner** has been appointed division engineer of the consolidated division, with **F. A. Williams** as assistant division engineer, both at Syracuse, and **J. V. Middleton** as assistant division engineer at Jersey Shore, Pa.

PENNSYLVANIA — These recent appointments have occurred: **W. A. Kautz, Jr.,** project engineer, Baltimore, to assistant engineer; **William Baxter,** engineer-in-charge, Powhatan, Ohio, to assistant engineer, Trenton, N. J., succeeding **N. M. Abel,** resigned; **C. L. McElheny** to supervisor track, Olean, N. Y., succeeding **M. W. Krug,** promoted to assistant trainmaster and supervisor of track; **H. J. Deeds** to supervisor track, Enola, Pa.; **R. A. Wisthuff** to assistant supervisor track, Philadelphia.

M. B. Miller, district engineer, Pittsburgh, to regional engineer, Cincinnati, succeeding **H. P. Morgan** promoted to assistant regional manager, Philadelphia; **E. M. Hodges** to district engineer, Pittsburgh; **E. Wollett, Jr.,** to district engineer, Cleveland; **J. M. Kirschner** to district engineer, Penn.-Reading Seashore Lines; **R. D. Baldwin** to district engineer, Richmond, Ind.; **R. E. Kleist** to assistant engineer — tests, maintenance of way, Altoona, Pa.; **D. N. Worfel** to assistant district engineer, Buffalo; **L. E. Williams, Jr.,** to supervisor track, Perryville, Md.; **R. D. Johnson** to supervisor track, Akron, Ohio; **D. R. Shoop** to supervisor track, Marion, Ind.; **D. B. Coward** to assistant supervisor track, Jersey City; **R. L. Stuart** to assistant supervisor track, Cleveland; **R. D. Wallace** to assistant supervisor track, Aspinwall, Pa.

P. J. Harnish, assistant regional engineer, New York, to regional engineer there, succeeding **H. J. McNally** promoted to area engineer, Chicago, who in turn succeeds **K. J. Silvey,** transferred to Pittsburgh to relieve **D. L. Sommerville,** retired; **J. T. Evans** to assistant regional engineer, New York; **M. K. Clarke** to district engineer, Canton, Ohio; **G. S. Lehman** to assistant district engineer, Canton; **C. R. Spence** to supervisor track, Newport, Pa.; **C. H. Gaut** to supervisor track, Monongahela, Pa.; **P. S. Servansky** to assistant supervisor track, East Liberty, Pa.; **C. G. Yund** to assistant trainmaster — supervisor track, Bicknell, Ind., succeeding **J. G. Eannace,** promoted.

READING — David E. Cowell, division engineer at Philadelphia, has been appointed engineer of track at the same location.

SANTE FE—Tom A. Blair, chief engineer of the Santa Fe System, with headquarters at Chicago, retired effective December 1 after 38 years of continuous service with this company.

SEABOARD — T. S. Williams assistant engineer of buildings, has been promoted to engineer of buildings with headquarters at Norfolk, Va., succeeding **J. C. Williams,** retired.

Tom A. Blair
Santa Fe

Albert E. Cawood
New Haven

Biographical briefs

Albert E. Cawood, 44, who was recently promoted to assistant to chief engineer of the New Haven at New Haven, Conn. (*RT&S,* Sept., p. 10), was born at Lynbrook, N. Y., and graduated from Rensselaer Polytechnic Institute in 1934 with a Bachelor of Science degree in civil engineering. He entered the service of the New Haven as a rail inspector in 1935 at New Haven. He later served as chainman, rodman inspector and transitman at Hartford, Conn., and Providence, R. I. until 1937. At that time he entered the office of the engineer of structures as a tracer, advancing to structural draftsman in 1938. Between February 1940 and July 1946 he served as bridge inspector at Boston, Mass. He was then promoted to assistant bridge engineer at New Haven, and was further promoted to engineer of structures in November 1954, the position he was holding at the time of his recent promotion.

J. J. Pomor, who was recently promoted to division engineer on the Canadian National at The Pas, Man., (RT&S, Nov.

(*Continued on page 62*)

Why this overwhelming preference for **Borate** *weed killers*

The answer lies in the dependability of borates to perform satisfactorily, safely, economically in destroying vegetation and preventing regrowth.

As the largest producer of borates in the world, we early recognized their plant-destroying properties. Then, before pioneering the specific use of borates for killing weeds, we did much field work and extensive laboratory research which proved their effectiveness conclusively. Our first weed killer, a sodium borate ore under the trade name of "BORASCU®", went to a major railroad on a trial demonstration basis. Results were extraordinary! Control of vegetation continued up to two years! This borate ore, as a highly effective, easily applied soil sterilant, also offered every desired safety feature by being nonpoisonous, nonflammable, and noncorrosive to ferrous metal. Soon, road after road began using this weed killer successfully and with marked economy. Tests conducted by one major road, about timber trestles on approximately 250 miles of track, showed a cost reduction from $1.48 down to only 19½¢ per lineal foot per year! (A total saving of $28,314.00.) With the acceptance of borates for weed work assured, we began developing other weed killers to meet various requirements. Now, a majority of roads are using one or more of our weed killers in preference to any other.

Today you have a choice of several safe and proven herbicidal borate formulations—each with special characteristics and advantages—to meet *your* particular requirements. We'd like to show you how you can start a labor-saving, dollar-saving weed control program... with borates. May we send a technically trained salesman to recommend and demonstrate the weed killer best suited to your needs?

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PACIFIC COAST BORAX COMPANY DIVISION

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In dollars per foot ot perfectly tamped track, the *Matisa Speedtamper* will give your M/W budget a real assist.

This machine retains the unbeatable Matisa principle of vibration-compaction tamping with the machine load always on tamped track, but now has many *PLUS* features:

Now hydraulically positioned tamping units for positive action, faster production. The *most efficient use of hydraulics has been applied throughout the machine.*

Now V-belt drives with multiple disc clutches — add safety, cuts maintenance, eliminates gears and noise.

Now instantaneous split-head operation switches fro speed surfacing to deep tamping without interruption.

Now pneumatic control valves with assured separate a supply from a small compressor on the diesel engin

For details, write for the New *Matisa* Speedtampe brochure.

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RAILWAY
TRACK and STRUCTURES

News notes...

. . . a résumé of current events throughout the railroad world

Five railroads in New England are considering the possibility of a merger. They are the Maine Central, the New York, New Haven & Hartford, the Bangor & Aroostook, the Boston & Maine and the Rutland. This news comes from E. Spencer Miller, president of the Maine Central. If consummated, merger of the five railroads would create the nation's ninth largest rail system, having assets of over $880 million and handling more than 92 per cent of all Class I rail business in the New England area.

•

A 14 per cent increase in freight revenue ton-miles is predicted for railroads in 1959 by the Value Line Investment Survey. As a consequence, this investment service forecasts a generally favorable year for the railway supply industry. Singled out by the survey for "an exceptionally prosperous year in 1959," were manufacturers of maintenance supplies and repair parts. This forecast is made on the basis that railroads can probably manage to defer purchase of new rolling stock for a while longer, but that further deferral of maintenance work is unlikely.

•

Two developments have occurred as a result of an accident on the Central of New Jersey on September 15, in which the locomotive and three cars of a five-car passenger train fell into Newark Bay, resulting in the death of 48 persons and the injury of 48 others. First: the Interstate Commerce Commission has issued a report on the accident, stating it was caused by failure to operate the train in accordance with signal indications Second: the CofNJ has requested ICC authorities to install a system of automatic trippers on the approaches of its Newark Bay bridge, and is installing so-called "dead-man" controls on passenger locomotives. The trippers are designed to stop trains if they proceed in violation of signal indications.

•

The Kansas City Southern and the Missouri Pacific have won an important round in their battle to obtain equitable treatment from taxing bodies in Kansas. The state's supreme court, reversing a lower court ruling, has ruled these railroads have a valid dispute in their efforts to recover taxes paid under protest. The case revolves around railroad allegations that their property is assessed at 60 per cent of actual value, while other property in Kansas is assessed on a far lower ratio.

•

The railroads should spend $2 billion annually for capital improvements in the future, asserts President Stuart T. Saunders of the Norfolk & Western. The stepped-up capital expenditures are required if the railroads are to realize "anything like their full potential," he declared. With the pace of technological change "accelerating at an ever-increasing rate," he foresees numerous opportunities for productive use of capital.

FOR TIE REPLACEMENT...

The Kershaw Tie Replacer Removing Old Tie

The Kershaw Track Crane Inserting New Tie

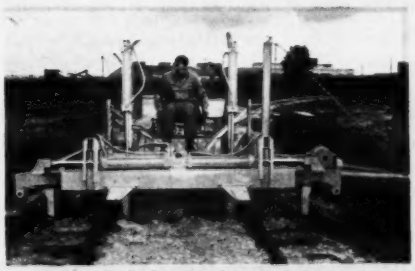
2 MACHINES, 5 JOBS

Now with the Kershaw Tie Replacer and Track Crane, old ties can be taken out, new ties inserted and new ties redistributed with only two machines and four men.

The Kershaw Tie Replacer (1) lifts the rail, (2) removes old tie, regardless of condition of tie or ballast, and (3) scarifies the tie bed. The new tie inserter attachment on the Track Crane then (4) inserts the new tie ready for spiking. The Track Crane then (5) redistributes ties along side of track. At no time during the entire operation has the track been raised.

On a recent test the two machines with only 4 men averaged replacing 58 ties per hour without humping track. For higher production at lower costs, try the Kershaw Tie Replacer and Track Crane.

For further information call or write



Tie Replacer Scarifying Tie Bed

Booster Is Used When Necessary To Start Ties in Cemented Ballast

Track Crane Redistributing Ties

KERSHAW
MANUFACTURING CO. INC
MONTGOMERY ALABAMA

Dear reader:

RAILWAY TRACK and STRUCTURES

If you had more money to spend?

This is budget time. Budgets covering 1959 work programs have been submitted on many roads and are in the final stages of completion on others. Each man—from track supervisor to chief engineer—who has a finger in the business of preparing budgets has had, or will have, the opportunity of stating what he feels is needed. In doing so he is fully aware that what he finally gets will be somewhat less that what he asked for. The question in his mind is: How much less?

The business prospects for next year will determine the answer to this question. The trend right now is upward. That trend has prompted one investment service (page 13) to predict an increase of 14 per cent in railroad freight revenue ton-miles next year. What holds particular significance for maintenance men is the further conclusion by this service that railroads can probably manage to defer purchase of new rolling stock for a while longer, but that further deferral of maintenance work is unlikely.

This turn of events was probably in the minds of the Program Committee of the Metropolitan Maintenance of Way Club (New York) when it asked three M/W officers to discuss, at a recent meeting, the question; If there is an increase in my '59 budget where would I spend it? The speakers were J. D. Fraser, a division engineer on the New York Central; R. D. Scanlin, a track supervisor on the Lehigh Valley; and A. J. Syvertsen, a supervisor of track on the Pennsylvania.

The discussion was revealing in various ways. What impressed a listener more than anything else, however, was the revelation that increased budgets raise some difficult problems. Mr. Fraser put his finger on the difficulty when he said: "It is very easy to have a plan for cutting. You merely defer a job. But to increase production or work, you must have some sort of a plan that tells us where we can obtain material quickly. Man power can certainly be called back but do we have the proper machinery to go ahead on track maintenance and do a job that would not conflict with work already in progress . . . ?"

The need for a plan is, indeed, paramount. It is one thing to take the additional money and allot a bit of it here and a bit there without the benefit of any particular strategy except to get more work done. It's quite another to attack the problem with the objective of getting the greatest possible mileage out of the additional funds

As Mr. Fraser implies, this requires a plan. Mr. Syvertsen didn't offer a formal plan but he suggested a general aproach that could be used as the basis for one. We should, he said, "spend our budget increases for machinery to give more of our men power to do more work." With the savings thus effected he would buy improved materials, such as heat-treated points and crossings, and also "appliances such as rail lubricators, tie pads and other appurtenances that will lengthen the life of the material we install."

The logic of this approach is that money spent in accordance with it will produce accumulative benefits. As Mr. Syvertsen puts it, the result will be "a sounder railroad physically and financially."

MHD

NOW

Your Choice of TWO Great *Kershaw* BALLAST REGULATORS

The Kershaw Heavy Duty
BALLAST REGULATOR

Whether your surfacing or ballast maintenance needs call for a heavy duty or a standard weight machine, Kershaw has the Ballast Regulator and Scarifier to fit your requirements.

The Kershaw Heavy Duty Ballast Regulator may be used in surfacing gangs, for shaping, and regulating, and may also be used for de-weeding and scarifying the ballast shoulder and providing drainage at tie ends. It is equipped with heavy duty differential axles with enclosed drive and a longer wheel base. The front axle is spring mounted for wheel flange contact with rail even on the roughest track. The Heavy Duty Ballast Regulator features as optional equipment a Road Crossing Scarifier which removes dirt or macadam from road crossings in minutes. Track Broom and Snow Blower Attachments also are optional equipment.

Either Machine Performs 14 Different Operations

The Kershaw Standard
BALLAST REGULATOR

If your work load does not require a heavier machine the Kershaw Standard Ballast Regulator is ideal for your surfacing and scarifying needs. It may be used as a track patrol to scarify, de-weed, regulate and shape shoulder ballast and with surfacing gangs to regulate and distribute ballast after unloading ahead of the gang.

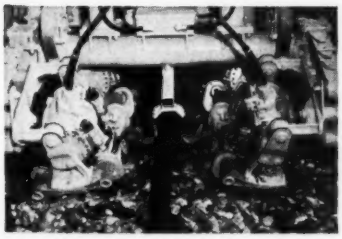
FOR ADDITIONAL INFORMATION . . . WRITE OR CALL

KERSHAW MANUFACTURING CO. INC

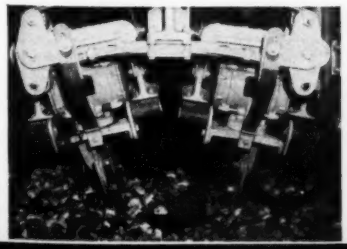
P. O. DRAWER 1711 MONTGOMERY ALABAMA

UNMISTAKABLY

THE CHAMP FOR '59



Perfect consolidation of ballast right under the rail and from end of tie to specified distance inside the rail.



As its record on dozens of leading railroads clearly indicates, the JACKSON TRACK MAINTAINER has had no close rival in its dual function of quality production tamping and maintaining track of finest characteristics under all conditions. Now, with much more powerful tamping motors, more speed, a simplified power plant of more than ample capacity and other refinements, it increases that wide margin of superiority which lead to its adoption by the great majority of American railway systems.

Write, wire or phone for the facts and you, too, will recognize the JACKSON MAINTAINER as unmistakably the CHAMP FOR 1959.

JACKSON VIBRATORS INC.

LUDINGTON **MICHIGAN**

Reade's Dry Weed Killers

For Dry Application . . .

There are many places where Dry Weed Killers can be used to advantage by railroads, due to the fact that they are easily applied by hand-broadcasting, with small spreaders or large equipment. Dry weed killers may be used to advantage around Yards, Sidings, Stations, Buildings, Bridges, Trestles, Signals, Fences, etc.

M/W-4 Dry Weed Killer

A uniform combination of Borate and CMU (3-p-Chlorophenyl, 1-l, dimethylurea) in granular form. It is used for the control of annual and most perennial weeds and grasses.

M/W-8 Dry Weed Killer

M/W-8 is also a combination of Borate and CMU (3-p-Chlorophenyl, 1-l, dimethylurea) in granular form, but containing a larger amount of CMU. It is designed for use in controlling vegetation and especially weed growth which is generally considered difficult to destroy. In many cases, light or spot treatment will show second season benefits.

Our years of experience as the pioneer company in the weed killing field qualifies us to study your requirements and provide the formulation best suited to your conditions. Suitable equipment for the distribution of our Dry Weed Killers is available.

We will welcome the opportunity of reviewing with you your weed or brush control program.

READE EST 1883 **READE**

READE MANUFACTURING CO., INC. — JERSEY CITY 2, N. J.

A-W Hydraulic Crane at work in Burlington Repair Yards at Lincoln, Nebraska.

This AUSTIN-WESTERN HYDRAULIC CRANE

is our most useful tool

Says the foreman of the Burlington Lines repair yard at Lincoln, Nebr.

The Burlington Lines repair yard at Lincoln, Nebr., takes on some 125 to 170 freight cars a day, some of them requiring minor repairs, but many of them calling for a complete rebuilding job. It involves work on 175 axles a week as an average—quite a materials-handling problem.

Install Austin-Western Crane. "To solve the problem, our operating department installed an Austin-Western crane April 1, 1955," the foreman says. "It proved the answer to so many problems that in October of that year we ordered a second unit for this yard, which has been in operation for more than a year."

72% saving over manual job. He goes on to say: "Transporting a gondola car full of brake beams to the storage yard, 100 yards away, formerly took three men for unloading and two men for moving the beams—five men working 8 hours per car—a total of 40 man-hours.

"With the Austin-Western, the operator and his helper now do the job in 4 hours at a cost of 8 man-hours for the men and 3 man-hours for 4 hours' use of the crane, a total of 11 man-hours. A saving of 29 man-hours, in this case, means a better than 72% saving over the manual unloading operation. This Austin-Western Hydraulic Crane is our most useful tool."

Extremely versatile. "For transporting axles and wheels we use a special sling. The operator drops this over the axle and hooks it. Then at the end of the run he releases it. All without getting out of his cab. With an 8-ft. manual extension on the 18-ft. extensible boom, the operator can handle steel doors for box cars, often to the second track over, thus shortening the distance to the car under repair. . . . Unloading steel in almost any form from gondola cars is a daily chore of this crane. . . . Makes every heavy item in the repair yard more accessible and more speedily available. . . . Its greater precision in placing the load or holding a part while being welded or fastened is important, as in the case of the car doors, which are held in exact position. This is a big time-saver."

For the complete Burlington story, write for Gould Report No. 5607.

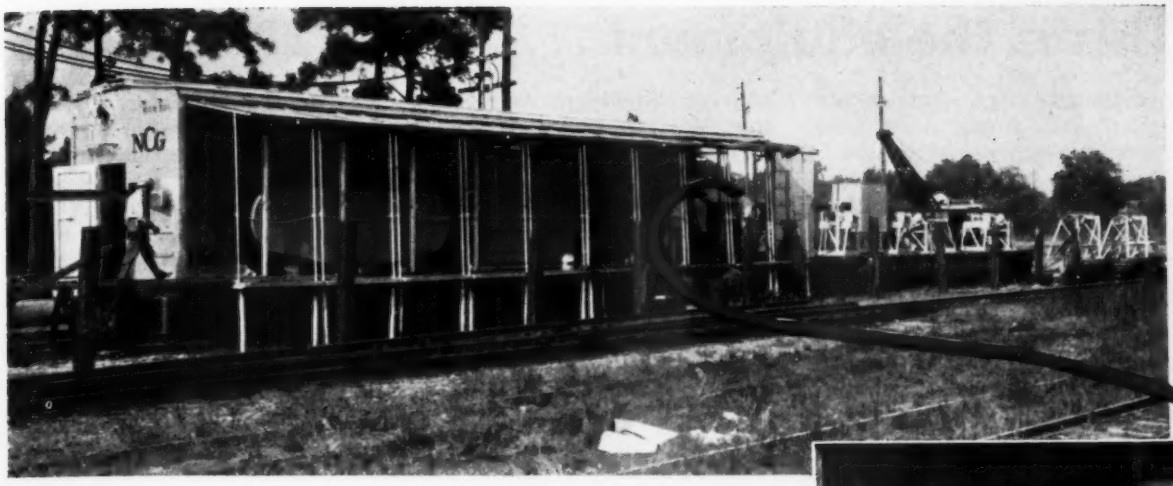
Austin-Western CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

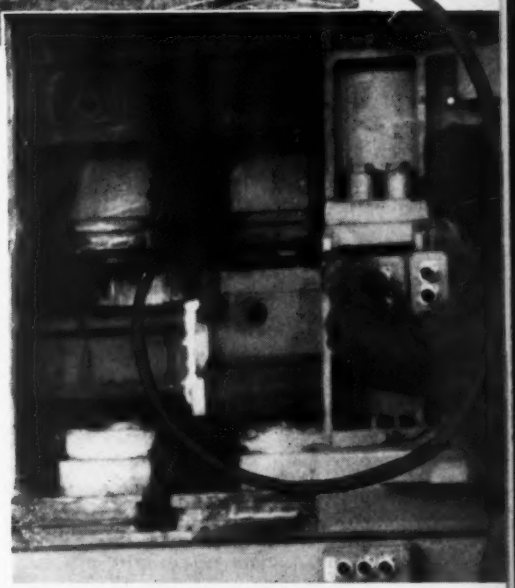
BALDWIN BLH LIMA-HAMILTON

RAILWAY
TRACK and STRUCTURES



Automation takes over in rail butt-welding

At Mobile, Ala., the L&N made an average of about 10 butt-welds per hour in 132-lb rail. And it achieved this production with a total of only eight men who performed all operations involved in welding and loading the long rails on flat cars. This performance was attributed to the use of welding equipment, leased from the National Cylinder Gas Division of Chemetron Corporation, that is largely automatic in operation.



WELDER OPERATOR'S station is "nerve center" where push buttons give control over most production-line operations.

• The long lengths of welded rail were coming steadily off the production line and nosing their way out onto the rollers on the string of flat cars. In this butt-welding operation on the Louisville & Nashville at Mobile, Ala., only eight men could be counted. They were performing all the operations involved in converting 39-ft rails into strings 1326 ft long and loading them onto flat cars ready for transportation to the point of use.

It was apparent that the age of automation in butt welding had arrived.

At the touch of a push button, rails to be welded were lifted from a storage bed and placed on powered rollers which carried them to the electric flash-type welder, largely automatic in operation. Among the automatic features of the welder was a shear block that removed most of the upset metal from each new joint. Then, as the welded string was being moved forward by a push-button operated "pusher" device, the remaining excess metal was removed by a grinding machine with automatic controls.

In this operation the L&N was welding new 132-lb RE rail into lengths of 34 rails. This length was dictated by that of an available side track at Mobile for loading the welded rails on flat cars; otherwise, they would have been made somewhat longer. Except for double lengths for use at highway grade crossings this is the first butt-welded rail to be produced for installation on the L&N. The current project calls for the production of about 14 track-miles of the long rail, which will require about 4000 welds. Early next year the welded strings will be installed in three stretches between Mobile and the Mississippi state line. It is expected that a small amount will be left over and this will be laid near Mississippi City, Miss.

The welding was being done with equipment leased on a unit-price basis from the National Cylinder Gas Division of the Chemetron Corporation. Central unit in the equipment is a "System Schlatter" electric flash resistance welder for which Chemetron has obtained exclusive manufacturing rights in the United States from the Swiss firm of H. A. Schlatter AG. The agreement also covers Canada, Mexico, Central America and most of South America.

The equipment and how it's used

This is the equipment . . .

• In developing a complete butt-welding package built around the System Schlatter welder the NCG Division had several objectives. One was to provide for American manufacture of all components, including the welder itself. Another was to incorporate features in the welder that would assure welds of the highest quality with minimum consumption of current. A third was to provide for the use of commercial power at locations where it is available. A fourth was to develop rail handling, grinding and related equipment designed to make the entire operation as nearly automatic as possible.

To obtain welds of the desired quality with minimum consumption of power it was necessary to provide, for the operation of the welder, low-cycle current of low voltage and high amperage. But this requirement had to be considered in conjunction with the decision to provide for the use of commercial power. What was required, therefore, was a welding transformer and frequency changer capable of converting 480-volt, 3-phase, 60-cycle power into the low-cycle current required for the welder. A combination of an electronic frequency changer and welding transformer proved to be the answer to this problem. This combination converts the 60-cycle current into 10.6-cycle current of about 7 volts and a maximum of approximately 90,000 amperes. The use of low frequency welding current results in a higher over-all power factor.

Grinder uses abrasive belts

The development of equipment for grinding off the excess metal from the welds after the major part of the upset metal had been sheared off in the welder presented a special problem. A requirement here was that the grinding operation be performed immediately after the weld was made and while the welded string was being moved forward to position the rail for making the next weld.

The equipment that was devised for this operation is said to represent the first use of abrasive belts instead of wheels for grinding welded joints. Basically, it consists of a series of roller-mounted endless belts operating longitudinally with the rail. They are so arranged that each grinds a particular surface of the section. Actually there are two grinding stations. At the first station the sides of the head and underside of the base are ground. The second station grinds the running surface of the head and both edges of the base. The contact rollers for those belts that grind the sides and running surface of the rail head are contoured for the particular rail section being welded.

Operation of the grinding-belt motors is controlled by push buttons. But the belts do not come in contact with the rail until caused to do so automatically when a feeler is actuated by contact with the excess metal on the web of the joint to be ground. When this happens air pressure is exerted through the rollers to force the belts against the rail in the proper sequence to obtain the desired rail finish.

The "pusher" that was developed for shoving the welded strings forward is motor operated and consists basically of two opposed endless treads. One tread bears upward against the base of the welded string and the other downward against the running head. Aluminum-faced pads are used on the latter tread to avoid scarring the rail surface. The pusher develops 25,000 lb thrust and provides for continuous motion of the rail at selective variable speeds in either the forward or reverse directions.

. . . And here's how it's used

• The operation on the L&N was an example of how the NCG equipment works in practice. Assembled early this year at Rockford, Ill., this outfit, as its first assignment, spent several months producing welded rail for the Great Northern at Havre, Mont., under a lease agreement. Late in September it was sent to Mobile where the contract to produce about 4,000 welds was completed late in November. For the operation at Mobile, where the equipment was set-up at a mid-city location, commercial power was available from a "high line" serving a nearby industrial plant. From this line, power was delivered to the welder through a temporary substation placed adjacent to the side track on which the welding outfit was parked.

As set up for operation at Mobile the welding equipment consisted, beginning at the head of the production line, of these principal elements: The rail feeder car; the welder car; a car containing the "Mag shack" (a shelter housing Magnaflux testing equipment); a series of rollers mounted on rail stands of graduated

The production line from start to finish ▶

1 Burro crane transfers 39-ft rails from push cars to storage rack f which they will be fed automatically to the welding production l

2 Rail is d

The equipment that was devised for feeding rails into the welder includes a storage rack, mounted at production-line level. Rails on the rack rest on two motor-driven endless chains mounted transversely to the production line. When the feeder mechanism is set in motion by a push button at the welder, two motor-driven arms on eccentrics lift the nearest rail and place it on powered rollers that carry it to the welder. Simultaneously, the remaining rails on the rack are moved forward by the endless chains until the next rail is in position for transfer to the production line.

At this point another belt-type grinder goes into operation automatically. Its purpose is to assure proper contact of the welding electrodes by removing mill scale from small areas of the running surface and base near the ends of each rail. Operation of this grinder is controlled by push buttons at the welder, but feelers actuated by the rail ends as they pass through the machine cause the belts to be brought in contact with the rail at the proper places.

Combined in package unit

In developing this welding equipment NCG engineers had to keep in mind the need for assembling it in such form that it could be moved about over the railroads and set up to form an efficient production line at any suitable point. To this end the welding unit, the grinding equipment and the pusher were all mounted in a specially designed 60-ft all-steel car. To provide ample working space and easy access to the equipment, one side of the car opens up to form a continuous walkway and canopy. The lower half of the sidewall provides the walkway and the upper half forms the canopy. The storage rack and other equipment for feeding rails to the welding machine were mounted on a flat car.

In these two cars are provided all the equipment necessary to produce continuous welded rail at locations where commercial power is available. To permit the butt-welding of rails at locations where it is not possible to use commercial power a third car containing power-generating equipment is available. In this car is an 860-hp diesel engine driving a 480-volt, 3-phase, 60-cycle welding generator, a smaller diesel generator set for providing auxiliary power, and other accessory equipment.

height to bring the welded rail down to flat-car level; and the string of 30-flat cars on which the long rails were loaded.

The rail stands were of heavy structural members and were mounted partly on two flat cars beyond the "Mag car" and partly on the ground in a gap between these cars and the first of the 30 cars. The arrangement of the rail stands was such that each welded string coming from the production line was maintained at a constant elevation for several rail lengths beyond the Magnaflux testing station.

Back at the head end of the production line a series of rollers was provided at production-line level for a distance of about 40 ft back of the rail feeder car. These served as a sort of "tail track" in event the Magnaflux testing should give an indication of a defective weld. In that case it would be necessary to reverse the welded string to bring the defective weld back to the welder for cutting and rewelding. Actually, however, the welding program had been more than half completed before any defect in a weld was indicated by the testing procedure.

Several months before the welding work was scheduled to begin the rail to be welded was unloaded and stockpiled at a location convenient to the head end of the production line. When the welding got underway a Burro crane was used to load the rail on two reinforced, heavy-duty push cars, move it to a point opposite the rail feeder car, and load it on the storage rack. Before the rails were placed on the rack their ends were polished slightly with a hand-held grinder to remove a thin coating of rust that had formed during the storage period. In the absence of rust this operation would not be performed and no other preparatory work on the rails is necessary.

The welding production line at Mobile was operated two shifts

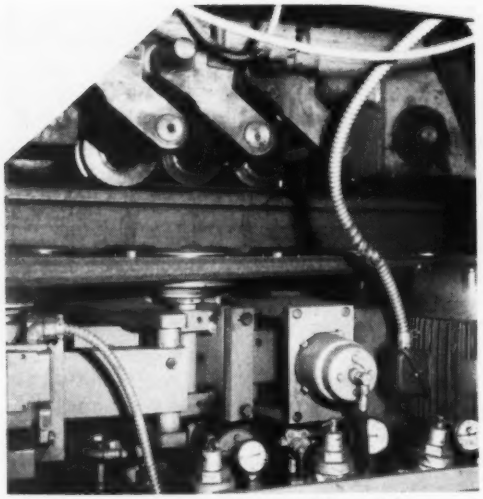
2 Rail is lifted onto powered rollers. This rail is drilled for attachment to preceding string.

3 Welder operator checks alinement of rail ends in welding machine.

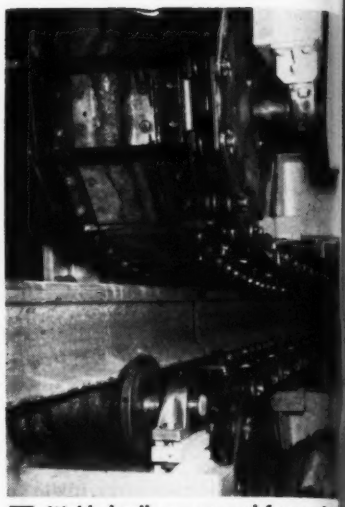
4 The weld is made. Normally a hood is lowered during this operation.

The production line continues

5 First grinding station shapes sides of head and underside of base.



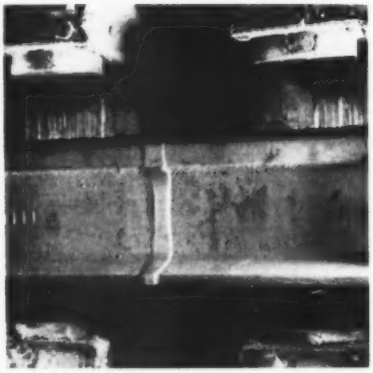
6 Running surface and both sides of base are ground at second grinding station.



7 Welded rails are moved forward (or backward if necessary) by "pusher."

8 In ar

Production line



WELDS look like this after excess metal has been removed by shear block.

daily. The first shift was from 5:30 am to 2:00 pm and the second was from 2:00 pm to 10:30 pm. During each shift a half hour was allowed for lunch.

Personnel provided by NCG on each shift consisted of two welder operators. The contractor also furnished two men who worked at night doing necessary repair and maintenance work.

The two welder operators on each shift alternated with each other in operating the welding machine. Generally their practice was to spell each other off at about 2-hr intervals. While one operated the welder the other acted as an assistant, helping in any way necessary to keep the production moving smoothly.

The welder operator's post is actually the control center of the entire operation. He not only operates the welding machine but also handles the controls for the rail feeder mechanism and the rail pusher.

Operation of the welding machine is an exacting task that involves a cycle of steps that occur in rapid succession. As a new rail is brought into the welder to join the rear end of the last rail welded, the operator, using straight edges, takes extreme care in assuring that the rail ends are properly alined. When this has been accomplished to his satisfaction he lowers the hood and starts the welding operation which thereafter takes place automatically.

In the welding procedure there is a preheating cycle that brings the rail ends to a plastic molten stage. At this point 30 tons of pressure are applied to squeeze the rail ends together for about 10 sec. As the final step an instantaneous hammer blow of 50 tons is applied that forces any foreign matter, gases and surplus molten metal from the joint. This action is accompanied by a resounding thump which signifies to the operator that the process has been completed. Immediately, the red-hot burr of molten metal is trimmed off to a fraction of an inch by the automatic shear block. The operator, using a pair of tongs, removes the ring of hot metal and tosses it into a pile on the ground beside the car. The actual welding operation takes place in less than 1¼ min.

On the completion of each weld it is again checked carefully for alinement. If it is found to be unsatisfactory the rail is cut apart at the weld, using an oxy-acetylene cutting device clamped to the rail, and the joint is rewelded.

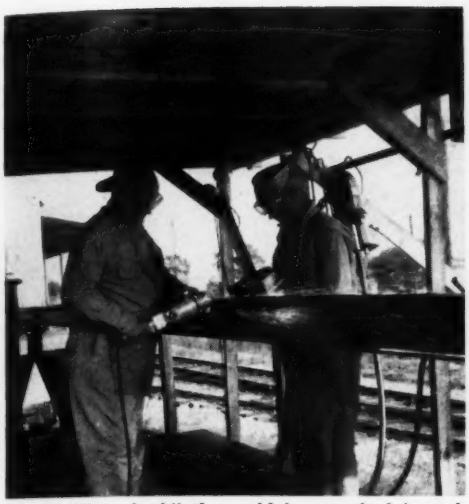
As each welded string of 34 welds was completed it was attached to the first rail of the following string by a rail of standard length. In this way the new string was made to force the completed length out onto the flat cars. Steel straps, or fish plates, were used when attaching the short rails, and the bolts were inserted in holes provided in the end rails for use in making field connections.

Except for the two welder operators all personnel required for the operation of the production line and the loading of the long rails is provided by the railroad. These other operations required only six men on each shift at Mobile. They were: 1 Burro crane operator; 2 Burro crane helpers; 1 electric welder; 1 welder helper; and 1 Magnaflux operator.

Duties of the six men

Since the loading of the rails on the storage rack required only a fraction of the time of the crane operator and helpers these men were available part of the time for helping out wherever they were needed along the production line. The polishing of the rail ends, for example, was done by one of the helpers. Also, these men helped in attaching and detaching the short rails that were used to connect successive long strings.

Two men were required in the "Mag shack." These were the Mag-



8 In "Mag shack" the weld is smoothed in web areas in preparation for the testing operation.

9 Testing of welds is done with Magnaflux equipment. Operators had training at Magnaflux plant.

A finished weld

naflux operator and either the welder or the welder helper. The latter assisted in the Magnaflux testing and also, along with the Magnaflux operator, performed a small amount of grinding on the welded joints. This grinding, which was done with hand-held power tools, was carried out for the primary purpose of smoothing the webs and adjacent surfaces for the testing operation. This is required because these surfaces are not ground by the belt grinders.

At the Magnaflux station a set of push buttons is provided that control a red and green light at the welder. While the testing and grinding is being done the red light is on. When this work has been completed on a joint the button is pushed to light the green light, signifying to the welder operator that he can place the pusher in operation.

Weld production of the outfit at Mobile averaged about 10 joints per hour of continuous operation. At times, however, the production ran considerably higher than this figure. The highest production for a single two-shift day was 180 welds.

Twelve strings on each train

For use in connection with the welding project the L&N prepared two strings of 50-ft flat cars to receive the long rails. The welding operation could thus proceed continuously while one string was being unloaded in the field. Preparatory work done on the cars included the installation of a set of rollers on each car. Each set was divided into 12 sections, separated by plate diaphragms, thus giving the cars a capacity of 12 strings of long rails. Filler blocks made of steel plates are applied at the couplings to eliminate slack in moving the cars of rails.

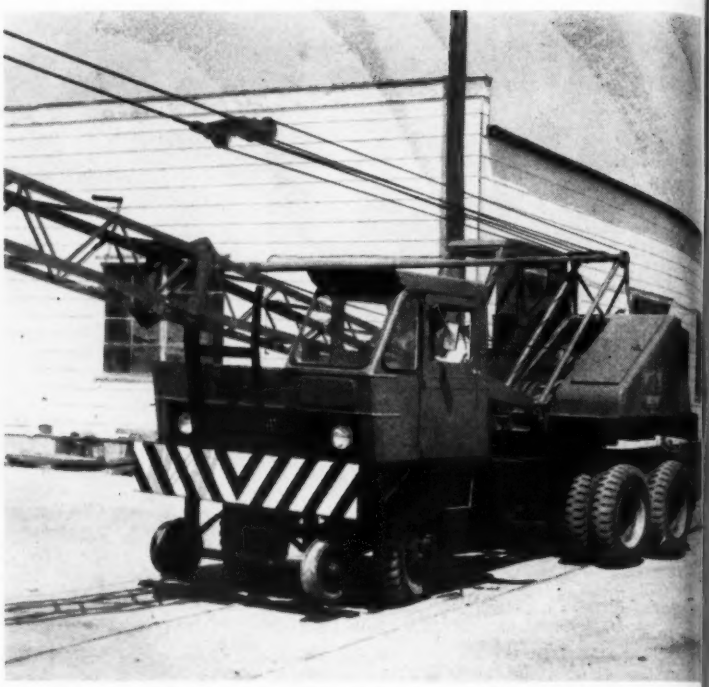
Near the center of each string of cars was provided a set of plates and bolts by means of which the long rails could be clamped in position to prevent longitudinal movement while the cars were in motion. On the end car of each string a removable bulkhead of heavy steel members was provided as a further precaution against longitudinal movement of the rails.

During the welding operation the end of the long rail being welded was fitted with a special shoe to facilitate its movement over the decks of the flat cars. One of the six men provided by the railroad was stationed on the flat cars to guide the rail across the proper rollers. This man was either the welder or the welder helper, whichever was not engaged at the moment at the Magnaflux testing station.

All matters connected with the rail welding work on the L&N are under the general supervision of H. C. Forman, chief engineer, and Edward Wise, Jr., engineer maintenance of way. In direct charge of the welding operation was C. T. Yarbrough, division engineer at Mobile. H. B. Lewis, assistant division engineer, supervised the work on the ground.

THE WELDED STRINGS, each made up of 34 standard-length rails, were loaded directly onto roller-equipped flat cars. Note second string of flat cars at left.

FLANGED dolly wheels are raised or lowered in a vertical plane by a screw jack at each wheel.



HOIST can be removed from the track at any level place. A full-reversing transmission allows a speed of 35 mph in both directions on either highway or railroad

This road-rail hoist is ta

The Rock Island looks for big savings from a specially engineered truck-mounted hoist equipped with flanged wheels. Primarily designed for bridge repair and renewal work, it is capable of doing a variety of jobs.

• In the fall of 1957 the Rock Island's chief engineer, W. B. Throckmorton, assigned a job to P. J. Calza, its engineer of utilities. The job: Develop a versatile hoist, capable of operating both on and off the track, that will enable the bridge and building forces to produce more work and thus reduce costs.

What Mr. Throckmorton had in mind primarily was the need for a machine that would simplify and speed up the work of renewing timber stringers, bridge ties and similar members in both timber and steel bridges, but not so specialized that it could not be used for other railroad work.

The result is a 7-ton, truck-mounted hoist equipped with flanged wheels, which has already proved itself in service, according to the road's officers. It was engineered and developed by the Schield-Bantam Company, Waverly, Iowa, working in collaboration with Mr. Calza. Here are some of the features of the machine:

(1) A maximum capacity of 7 tons without the use of outriggers.

(2) An operating capacity of 2½ tons at a radius of 22 ft with the ability to swing and move forward or backward under this load.

(3) Rubber-tired wheels, as well as flanged dolly wheels, set to standard railroad gage.

(4) Remote control operation of all movements of both carriage and hoist from the hoist cab.

(5) Full 360-deg vision from the hoist cab.

(6) A full reversing transmission which permits equal speeds both forward and backward on either railroad or highway.

(7) Dolly wheels and outriggers that are mechanically operated in order to cut maintenance and eliminate "costly automatic equipment."

(8) Accessory equipment for versatility, including ⅜-yd bucket and a ⅜-yd clamshell. Also a standard backhoe attachment is available for use if ever deemed necessary.

Reason for 7 tons capacity

Operation of 7-ton off-track hoists with the road's composite bridge and building-water service crews had demonstrated that a hoist with a 7-ton maximum capacity was adequate for most repair and renewal jobs on trestles and bridge decks. The operating capacity of 2½ tons at a radius of 22 ft was established as giving the optimum range needed on the types of work which the machine would be called upon to do. The requirement of full mobility at this capacity and radius insured maximum capability on the job.

The road-rail hoist is actually a Schield-Bantam T-35 mounted on a highway carrier adapted to operation on railroad tracks. The front wheels and the inside wheels of the rear dou-

OPERATOR in cab of hoist has full 360-deg vision and can control all movements of both carriage and hoist from this location. Mobility and swing are maintained under an operating capacity of 2½ tons at a radius of 22 ft. Maximum capacity is 7 tons without outriggers.

tailor-made for RR bridge jobs

ble tandem are set to operate on top of the rails when the flanged wheels are in operating position. All six rubber-tired wheels are drive wheels. The four flanged dolly wheels are set at the front and rear of the carriage. They are raised or lowered in a vertical plane by means of a mechanically operated 15-ton jack at each wheel. When the hoist is operating on the track its 21,000-lb weight is distributed 70 per cent to the rubber-tired wheels and 30 per cent to the flanged wheels.

Two sets of outriggers are provided, one at the middle of the carrier, and the other at the rear. They may be extended a maximum distance of four feet and are controlled by mechanical screw jacks.

Why equal speed in reverse

The carrier has a top speed of 35 mph both forward or backward and for either highway or track operation. The feature of equal speed in forward and reverse was considered essential since the hoist was designed to operate on the tracks. This meant that, in order to have the maximum amount of time on the job, the machine had to be able to move into the clear as fast backwards as it moves to the job frontwards. It can be placed on, or removed from, the track at any highway crossing or level stretch of ground.

The hoist has a 25-ft two-piece boom that can be extended to a maximum of 60 ft in 5 or 10-ft increments. A boom length of 35 ft is normally used. Two sheaves are provided at the tip for the operation of two live lines. Future machines, however, will be equipped with three sheaves at the tip of the boom.

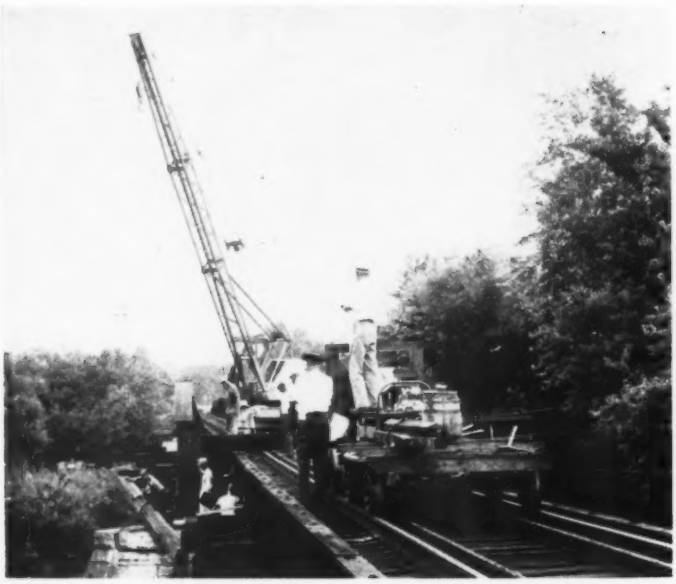
In addition to the drag bucket and clamshell the hoist is furnished with rail tongs, timber hooks and cable slings to give it a wide range of versatility. Additional accessories to do other work, such as pile driving and backhoe work, are under consideration.

Planning on the new hoist commenced in September 1957. It was ready for service on July 1, 1958. Possession was taken by the railroad on July 30 and the machine was moved to Toddville, Iowa, for its first job. On July 31 it was assembled and greased preparatory to undertaking the replacement of stringers on Bridge 99 on August 1 (see next page).

Engineering officers of the Rock Island express themselves as being highly pleased with the performance of the machine on its first job and on subsequent work. On September 4, a meeting was held at Kansas City for the purpose of introducing the machine to the road's division engineers and master carpenters. The highlight of this meeting was a moving picture showing the hoist in action on one of the jobs accomplished during the first month of its operation. Primary purpose of the meeting was to demonstrate the capabilities of the hoist and to obtain ideas as to how it could be utilized to best advantage.

Engineering department officers of Rock Island feel that they could effectively use more of these hoists.

Jobs it can do



CAP RENEWAL The crane here carries old cap removed from pile trestle approach. Later it installed the new cap.

TIE HANDLING A bundle of ties is handled into position on bridge re-decking job.

CLAM

It handles a variety of jobs for the bridge department

Here's how it's used to change out stringers in a timber trestle

Old timber chords

• Bridge No. 99 on the Rock Island division at Toddville, Iowa, needed new stringers. It is a single-track, open-deck pile trestle consisting of ten 14-ft panels. Stringers were 8-in by 16-in members bolted together with staggered butt-joints to form 4-ply chords in lengths of 28 ft, or two panels. They are fastened to the bents by drift pins into each cap. One of these chords 28 ft long weighs approximately 4000 lb.

The plan was to replace the four untreated fir stringers comprising the chord under each rail with three creosote-treated fir stringers. The reduction in timber was called for by revised standards of the railroad for this type of structure on light loaded lines.

Here's how it was done:

Preparatory to the actual work the new timbers were framed to the exact length and the cut ends were painted with creosote. Stringers for the entire left chord of the bridge, which were to be inserted first, were then piled on three push cars, the first timber required being placed on top. The push cars with the stringers were then shoved ahead of the machine to a point just off the bridge.

The stringers of the left chord were changed out first in this sequence of six steps:

Step 1—All drift bolts holding the left chord to the caps were removed.

Step 2—The chord was cut over every second bent, thus dividing it into 28-ft lengths, each spanning two panels. The cut was made 2 in beyond the center of the cap. This gave adequate end room for installing the new stringers.

Step 3—The left side of the deck was then raised, using the hoist, and blocked with 4-in by 4-in by 19-in blocks placed between a bridge tie and cap at each of three bents, thus clearing a 28-ft section of chord.

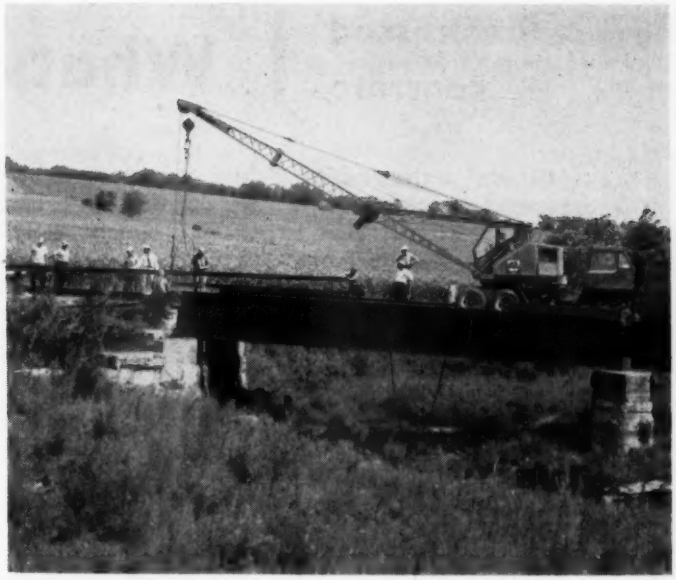
Step 4—With the road-rail hoist operating from the track over the adjacent panel on the bridge, a 28-ft section of the old chord was swung out from under the ties, hauled to the end of the bridge and deposited on the bank.

Step 5—Returning, the hoist reached across the two panels from which the chord had been removed to start removing the new timbers from the push cars. The top member was lifted by the hoist and placed on the caps. The second and third stringers followed. They were not, however, placed in final position under the rail at this time.

Step 6—The blocks under the ties were removed, dropping the deck onto the newly placed stringers.

While these steps were being repeated in the next two panels, the new stringers in the first two panels

CLAMSHELL WORK Bridge end is backfilled with ⅜-yd all-purpose bucket.



RAIL HANDLING The crane removes rail from 90-ft bridge preparatory to renewing the ties.

come out of bridge in two-panel lengths

were worked into place under the rail to final position and holes drilled for the chord bolts. No packing washers were used, the stringers being placed tight against each other.

These steps were repeated until the opposite end of the bridge was reached.

The new stringers under the left rail were in place and in process of being bolted up 4 hr after starting the job. The work of bolting these chords was completed before renewal of the stringers on the right side of the bridge was commenced.

The removed chords were picked up from the bank and hauled into Toddville where the bolts were cut, good timber salvaged and the remainder burned.

Benefiting from its experience with the hoist and the method of operation used on the left side, the crew had new stringers on the right side in place under the rail 1 hr 30 min after starting work on this side.

This job was carried out by an extra bridge crew composed of a foreman and six men. The gang had not seen the new hoist until it arrived at Toddville to do the job. In addition, this was the first job for the foreman of the crew since his appointment as foreman.

TWO-PANEL, four-ply chord weighing 4000 lb, is removed in one piece by hoist. New stringers are placed on the caps singly, worked under the rail and then bolted up.

Prestressed concrete | What it is—how it's used in

Almost unheard of a few years ago, prestressed concrete is rapidly coming into common use in railroad bridges. In this article, based on an address presented before the Bridge & Building Association, Mr. Nicholson explains its special properties and describes several types of prestressed bridges.

• Coming into use in the United States within the last few years, prestressed concrete is already recognized as one of the great advances in construction of the twentieth century. Prestressed concrete provides builders with a material of superb strength, adaptability and economy.

Although the application is new, the principle of prestressing is old. The first patent for prestressed concrete was issued in 1886 to a San Francisco engineer named Jackson who realized that, if he could place all the concrete in a beam into compression, he could carry greater loads with the same size beam.

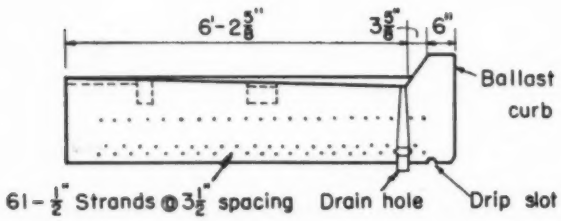
Unfortunately his system did not work, because in time the concrete shrank to the point where his bar, made of ordinary steel, lost its tension and no longer compressed the concrete. Today, however, we have high-tensile steel which can be stretched enough to keep most of its tension even after the full shrinkage of the concrete has taken place.

To understand the principles of prestressed concrete, we will have to turn to the simple theory of structures. A beam placed across two supports will deflect downward under a load. The concrete along the top of the beam is "squeezed" by compressive forces, and the concrete along the bottom is "stretched" by tensile forces.

It must be kept in mind that, while the compressive strength of concrete is quite high, its tensile strength is low.

In a conventional reinforced concrete beam, the reinforcement is placed in the bottom of the member to resist the concentration of tensile forces in this area.

The concrete must crack before the tensile steel is stressed appreciably. As a matter of fact, about



ABOVE—In this view of the Burlington bridge the prestressed concrete span is at right.

LEFT—The single-span prestressed portion consists of two solid concrete slabs like this.

CB&Q . . .

• Flat precast slabs

An event took place on March 11, 1954, that promises to influence greatly future bridge construction on American railroads. It was the construction of the first prestressed concrete railroad trestle in this country.* This new type of bridge deck, used by the Chicago Burlington & Quincy at Hunnewell, Mo., was a direct result of precast-prestressed trestle slab studies made by the research staff of the Association of American Railroads.

The single span, 19 ft center to center of bearings, consists of two flat precast slabs each 7 ft wide, 18 in deep and 19 ft 11½ in. in overall length. A ballast curb was cast integrally with the two slabs and provision for drainage was made by sloping the deck surface and installing two drain pipe outlets along the curb.

The slabs were designed for E-72 loading plus full impact as prescribed by specifications of the American Railway Engineering Association.

* A detailed article describing this bridge appeared in *RT&S* for April, 1955.

in railroad bridges

By Leo P. Nicholson
Railway Representative
Portland Cement Association
Chicago

one-third of the concrete in a rectangular beam with conventional reinforcement is assumed to carry stress. It is assumed that approximately the bottom two-thirds will crack under load, and therefore will not contribute to the beam's structural strength.

In prestressed concrete we "pre"-compress the concrete before the superimposed loads are applied and then, when loads are imposed, the concrete in the entire beam remains in compression. This means that all the concrete is helping to support the working load.

There are two basic types of prestressing — "pretensioning" and "post-tensioning." In pretensioning, high-tensile steel is stretched between fixed points before the concrete is placed. Concrete is then placed and cured and, after sufficient strength is attained, the stretched steel is released and the force is transferred to the concrete.

In post-tensioning, the concrete is cast around but not in contact with the unstretched high-tensile steel. After the concrete has cured and attained sufficient strength, the steel is stretched and the force is transferred to the concrete by attaching plates to the end of the steel.

Here are some of the things prestressing does:

(1) Makes possible the economical use of high-strength concrete.

(2) Makes crackless concrete possible, which is conducive to greater durability under severe conditions of exposure.

(3) Makes it possible to use thin-web concrete members of I- and T-sections, thus realizing considerable savings.

(4) Allows a reduction in the depth of beams and girders and the thickness of slabs, thus affording greater underclearance.

(5) Results in very stiff members at working load and there is good recovery of deflections caused by overloads.

(6) Reduces the effects of shear and diagonal tension.

(7) Makes the entire cross-section of the concrete available for resisting moment prior to cracking.

(8) Automatically proof-tests a member because under maximum conditions of loading the stress in the steel and concrete will seldom exceed that produced by the initial prestress.

(9) Makes it possible to greatly increase economical span lengths and can be designed to fit a greater variety of job requirements.

Southern . . .

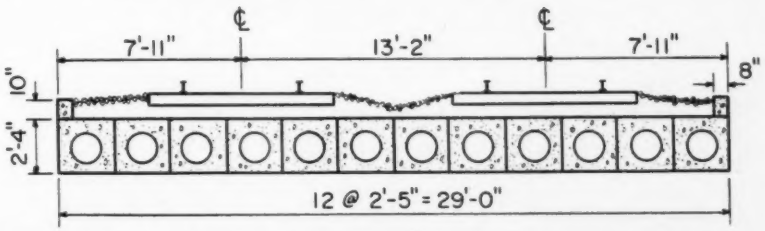
• Beams with voids

Two prestressed double-track trestles—one two-span and one three-span—were built by the Southern in 1957. The three-span structure has 26-ft 11-in pretensioned box-shaped beams. The beams are 2 ft 5 in wide by 2 ft 4 in high with 15-in diameter voids. Each beam contains 48 prestressing strands ⅜ in. in diameter. Each span consists of 12 beams, resulting in a span width of 29 ft. Precast concrete curbs 8 in by 10 in were bolted to the outside beams in 9-ft sections. Small V-shaped grooves between the boxes were filled with hemp and an asphalt mastic before the waterproofing membrane was applied.

The cross-sectional dimensions of the beams in the two-span structure are the same as those in the three-span trestle. These beams are 22 ft 11 in long and have 41 prestressing strands.

A live load of E-60 and an impact of 67 per cent were used in the design. The load was assumed to be uniformly distributed over 9 ft 8 in, or four beams.

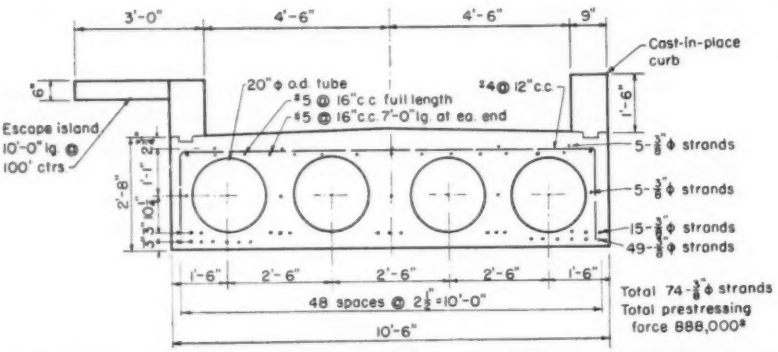
TWO-SPAN concrete trestle on Southern. It was erected without interrupting traffic.



ASSUMPTION is that load is uniformly distributed over four beams, or 9 ft 8 in.

Four more types

RAILROAD DECK (right) of Pelican Island Causeway before the track was placed.



DECK SLABS are 25 ft long. They were barged to site and erected by a 100-ton crane.

Galv. Term. . . .

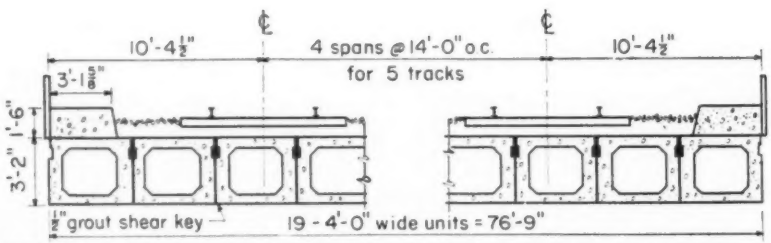
- **Slabs with voids**

Pelican Island Causeway is a combination railway-highway structure that connects Pelican Island with Galveston, Tex. The railroad deck carries the Galveston Terminal Railroad. This part of the structure consists of 84 pretensioned slabs each 25 ft long. Each slab is 10 ft 6 in wide by 2 ft 8 in high, with four 20-in diameter voids in each slab.

Slabs were transported from the casting yard in Pasadena, Tex., by truck and barged to the bridge site some 50 miles away.

Specifications called for a static load test to destruction of one of the railway deck slabs. It was required that there be no evidence of cracking before 90 per cent of the designed cracking load of 300 kips was reached. The first crack was noticed at 360 kips—20 per cent over the designed cracking load. Specifications required that the slabs carry a breaking load of 420 kips at midspan. Loading was continued to 460 kips, and the slab still had not broken.

STRUCTURE on Santa Fe in California has beams 34 ft 10 in long. Width is 76 ft 9 in.



SHEAR KEYS of dry-packed concrete grout provide for transfer of load between beams.

Santa Fe . . .

- **Box-type beams**
- **Rectangular voids**
- **Load transfer**

In March, 1958, a two-span, five-track prestressed concrete bridge was built for the Santa Fe over "C" Street in Colton, Cal. Each span consists of 19 pretensioned box girders, resulting in a span width of 76 ft 9 in. The girders, 48 in wide by 38 in deep by 34 ft 10 in long, have rectangular center voids. They each have 44 strands of ⅜-in diameter wire. One transverse 1¼-in diameter steel rod per span and a dry-packed concrete grout shear key provide the transfer of load from beam to beam.

The bridge was designed in accordance with AREA specifications and Bureau of Public Roads criteria. Design live load was E-65 and an impact factor of 60.8 was used. A three-ply, hot-mopped asphalt membrane was placed over the top of the finished deck and then covered with 1¼-in asphalt plank and rock ballast.

The girders were precast elsewhere and trucked to the site.

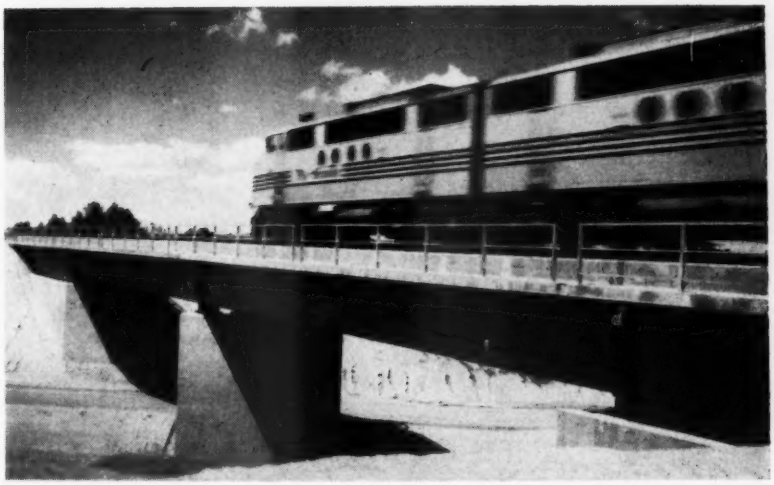
Santa Fe . . .

• T-shaped beams

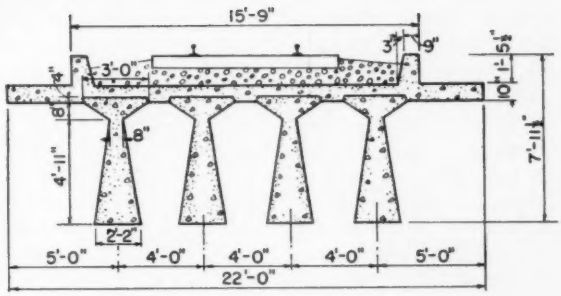
A number of records were broken in 1957 in the construction of the Air Force Academy, Colorado Springs, Colo. One of the most important and far-reaching is a new U. S. record for prestressed railroad bridge spans set by two bridges 144 ft long, built on the academy grounds for the Santa Fe. The bridges eliminate grade crossings at the entrances to the main academy grounds.

Each of the railroad bridges * carries a single track on two 70-ft simply supported spans. The girders were designed for E-72 loading plus a live load impact factor of 50.8 per cent. The required concrete cylinder strength at 28 days was 5,500 psi. Strength at time of prestressing was required to be 4,500 psi and the maximum permissible compressive stress at time of prestressing was 2,475 psi. The 1,180-kip prestressing force was applied through 11 tendons each composed of sixteen ¼-in wires.

* A detailed description of these bridges was published in *RT&S* for January 1958.



ABOVE—Span length of prestressed bridges on Santa Fe in Colorado is 70 ft.



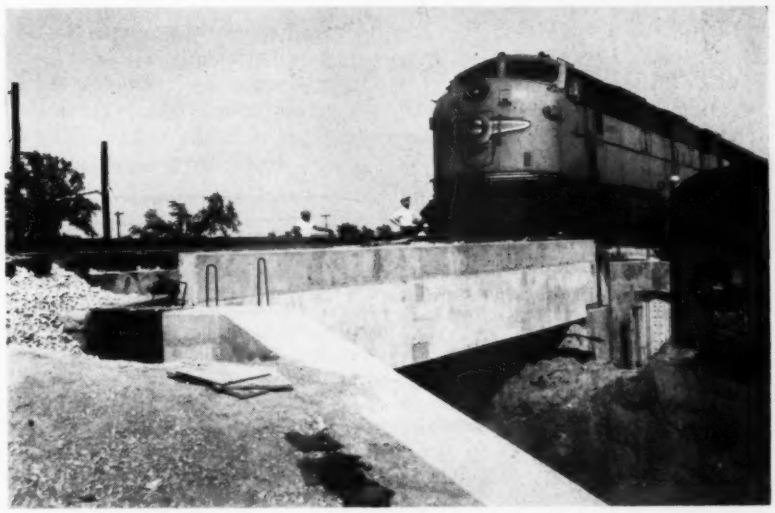
RIGHT — The girders were erected with a gantry crane and the concrete deck was poured in place.

C&NW . . .

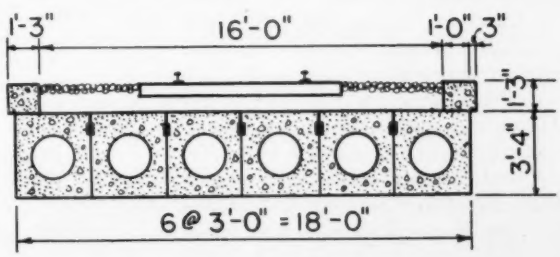
• Box-type beams
• Circular voids
• Load transfer

The first prestressed concrete railway bridge in the Midwest was erected in 1958 for the Chicago & North Western at Allouez, Wis. This 36-ft 6-in, single-span bridge consists of six rectangular box girders with circular voids.

Deck members were cast elsewhere and trucked to the site. They were assembled and lateral post-tensioning applied. Shear keys and post-tensioning cables were grouted and the deck covered with three-ply water-proof membrane and 1¼-in asphalt plank. After curing and waterproofing, the ballast and track were installed on the deck slab. Individual beams were both pretensioned and post-tensioned longitudinally. Sixteen strands 7/16 in. in diameter were used for pretensioning and two cables (12 by 0.276) were used for post-tensioning. The assembled span was rolled into place as a unit.



ABOVE — Bridge on C&NW was assembled and rolled into final position as complete unit.



RIGHT — Individual beams were both pretensioned and post-tensioned longitudinally.

What's ahead for crossties?

Members of the Railway Tie Association, meeting at Memphis late in October, faced some hard facts. One was the declining trend in tie installations. Another was contained in a prediction that tie renewals would sink to even lower levels.

● Tie renewals have been declining for years. This overall trend has been going on for nearly four decades. True, there have been years or brief periods when the curve has turned upward slightly, but these have been more than cancelled out by subsequent continuation of the general trend.

Which way will the tie-renewal curve go in the future? Is the curve in a trough now, presaging an upward trend later on? Or will the downward trend continue? If so, will it eventually flatten out?

The answers to these questions are important to the railroads. But they are even more important to another group of companies—the tie producers. To these companies the downtrend in tie renewals is a grim fact. Even more grim, however, were some predictions laid before them at Memphis, Tenn., late in October. The occasion was the annual convention of the Railway Tie Association.

Since the association was celebrating its fortieth anniversary, there was considerable reminiscing along historical lines. But there were also some attempts by speakers to look into the future, and what they saw was anything but comforting to the tie-producing companies. Here, in brief, is the dark picture painted by two speakers:

Short range—Crosstie installations in 1959 of only 20,707,000 ties.

Long range—A continuing downtrend in tie renewals until they reach the area of 16 to 19 million ties per year.

The estimate of 1959 tie installations was contained in tabulations accompanying an address by O. O. Albritton, chairman of the Purchases and Stores Division, AAR. Mr. Albritton is vice-president, purchases and stores, of the Illinois Central. His forecast did not "paint the kind of a picture that people in the tie industry would like to see during the months immediately ahead." But he had this one hopeful comment: "However, you so well know this situation can and will change rapidly with even a limited improvement in railroad income."

The prediction that tie renewals would sink to the level of 16 to 19 million annually was made by L. C. Collister, manager tie and timber treating dept., Santa Fe System.

In presenting data to show the declining trend of railroad crosstie renewals, Mr. Collister pointed out that renewals on U. S. roads in 1957 were only 67 per mile, while on the Santa Fe they were only 53 per mile, and still declining. He believes the downward trend will continue until the average tie renewals get to 50-60 ties per mile per year. "This will mean, based on today's mileage of 321,673, (renewals of) 16-19 million ties per year . . ."

"This isn't a good picture to bring to any industry because we all like to think of growing," said Mr. Collister. "However, indications are that, with CTC, possible mergers, and abandonment of non-paying branch lines, the present mileage will be reduced considerably."

Mr. Collister disputed statements that reduced tie renewals have produced substandard track conditions, and that the life of crossties in track is determined primarily by railroad earnings.

"I believe now, more than ever," he said, "that the life of a crosstie in track is a function of wood quality, preservative treatment and track construction," rather than earnings and other financial considerations.

Noting "many looks of doubt" on the faces of his audience, Mr. Collister outlined what is happening on the Santa Fe. Since 1950, this road has been carrying out an inspection program using trained men to mark ties for renewal. "This means that a more careful look has been given to ties in the last eight years."

As a result of this "careful look," the railroad found, said Mr. Collister, "and I'd venture to say other railroads have also found, we were taking ties out because they had reached a given age, regardless of condition. Stop and consider that each additional year of service life on ties in only 100 miles of track is worth $90,000. This picture causes one to take a closer look, and we found and are finding, 'characters' that look rough and yet are still sound, which would have come out from the first look.

"We are in the final stages of transition from softwood to hardwood ties. We have mechanized our tie-renewal program, we are using heavier rail, larger plates and better ballast, and we are dieselized. All of these factors are beneficial to the tie life."

Mr. Collister then noted that the Santa Fe is vapor drying all its ties, which is expected to minimize decay and checking and splitting.

Summarizing, he said: "Tie life will increase due to factors mentioned above, and with the continued decrease in miles of maintained track, tie production will continue to decline."

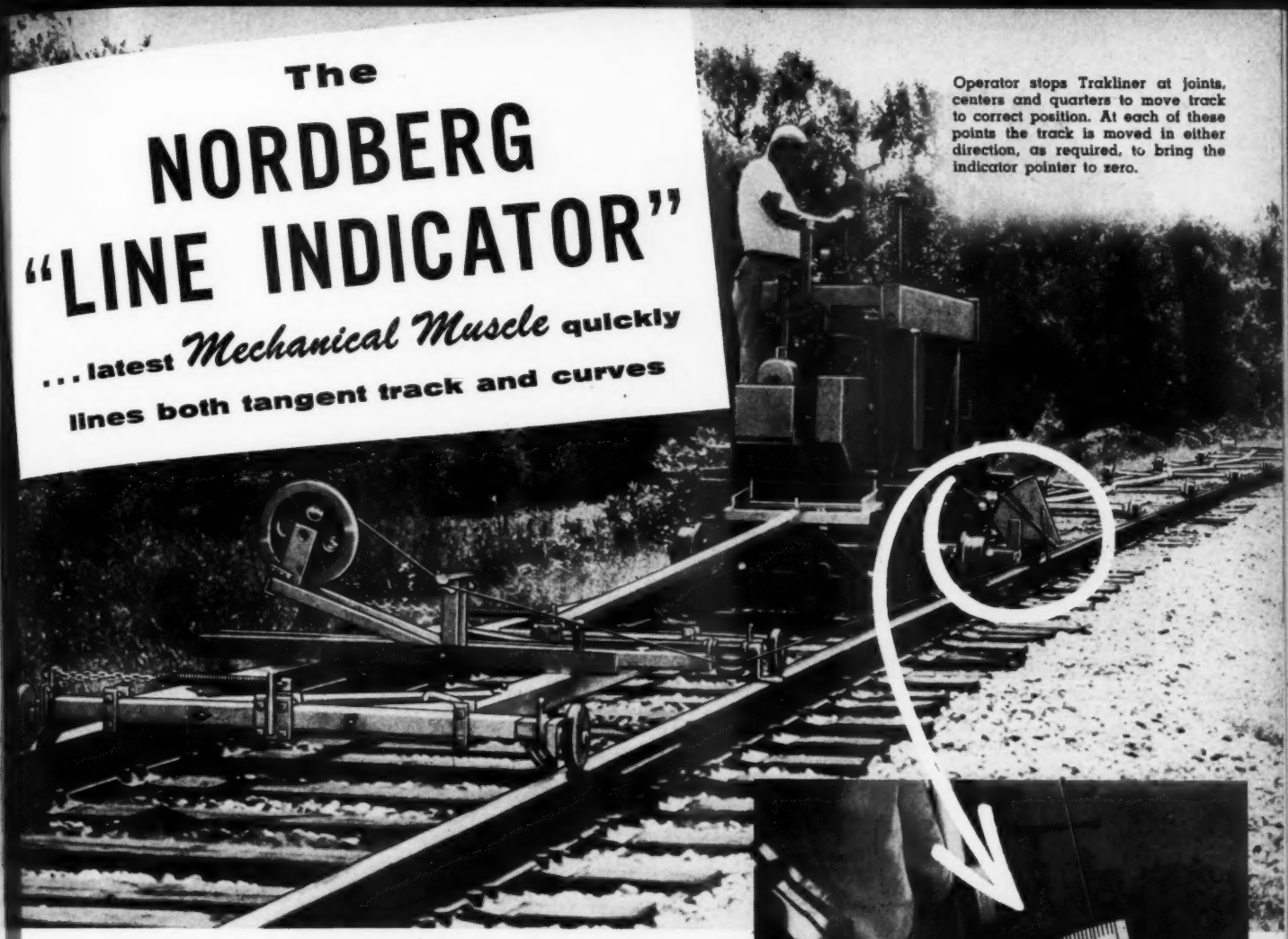
New developments coming in wood preservation

"The treating industry is just beginning to make new strides in the preservation of wood. You are aware of the work done by the Denver & Rio Grande Western under the leadership of Ray McBrian (director of research) in an effort to make hardwoods from softwoods through atomic radiation. An impregnant is being sought that will harden when irradiated. We are in the midst of a program endeavoring to treat refractive species with sonics, and I understand there has been a breakthrough in the ability to bond the tie plate to the tie.

"All of the above will tend to further prolong tie life." — L. C. Collister.

The NORDBERG "LINE INDICATOR"

...latest *Mechanical Muscle* quickly lines both tangent track and curves



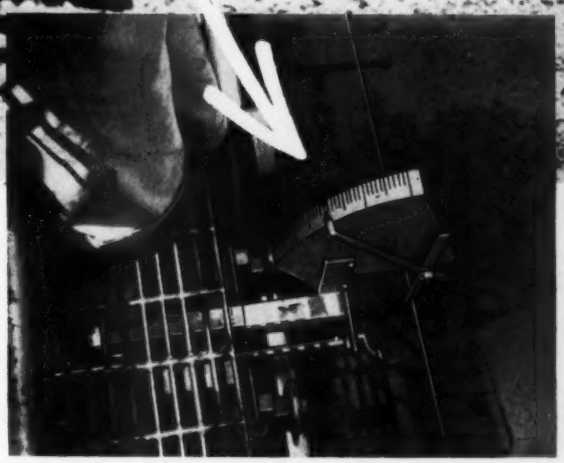
Operator stops Trakliner at joints, centers and quarters to move track to correct position. At each of these points the track is moved in either direction, as required, to bring the indicator pointer to zero.

Quick, lower cost lining of curves and tangent track is now possible with the Nordberg *Line Indicator*. Using the well-known Trakliner® as a central unit, this new "Mechanical Muscle" does the complete job of sighting and lining track.

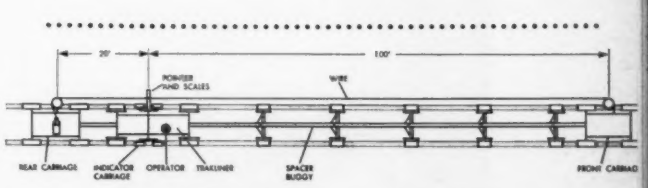
Sighting is accomplished with a 120-ft. length of wire. This wire is mounted on a moving assembly consisting of two 4-wheeled buggies which are maintained at proper distance from the Trakliner by lengths of tubing. One of the buggies is located 100′ ahead of the Trakliner and the other 20′ behind it. An indicator, mounted on a small carriage, is placed directly beneath the Trakliner in full view of the operator. If the track is out of line in relation to the reference wire, the amount of deviation is shown by a pointer on the indicator. The Trakliner then makes the correction.

Under average conditions, the Nordberg *Line Indicator* and Trakliner will line a rail length of tangent track in two minutes or less. In lining curves, two "passes" around the curve are made. The first, to obtain original "ordinates" and the second, to line to the desired final ordinates. A recently ballasted, one-degree curve, 4900 feet long, was lined by this method in only four hours.

A Trakliner operator and a man to adjust the pointer scale are all the crew that is required . . . together they can easily remove the light-weight buggies and tubular sections, as well as the Trakliner, from the track.



The single strand of wire used in the "Line Indicator" is carried in a fixed position and passes through the indicator at the Trakliner as shown above. If the track is out of line, the amount of deviation is shown by the pointer. Prior to lining, the reference wire is accurately adjusted so it is equally distant from the gage side of the line rail at the front and rear buggies, and at the pointer carriage. *Note arrangement of unit in diagram below.*



R158-R

Write For LEASING Plans

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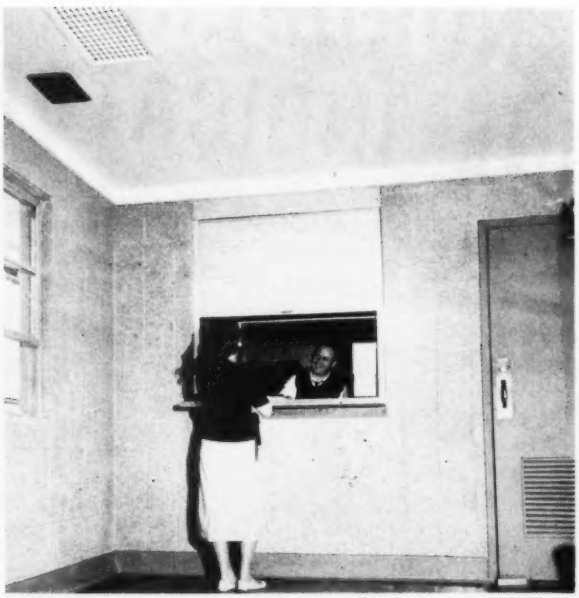
Milwaukee 1, Wisconsin

NORDBERG
Mechanical Muscles®

CLOSED-CIRCUIT television on Delaware & Hudson at Cohoes, N. Y., tells crossing tender when to lower gates at a nearby crossing. The monitor gives a picture of switching engines approaching the main line from an industrial spur track a half mile away.



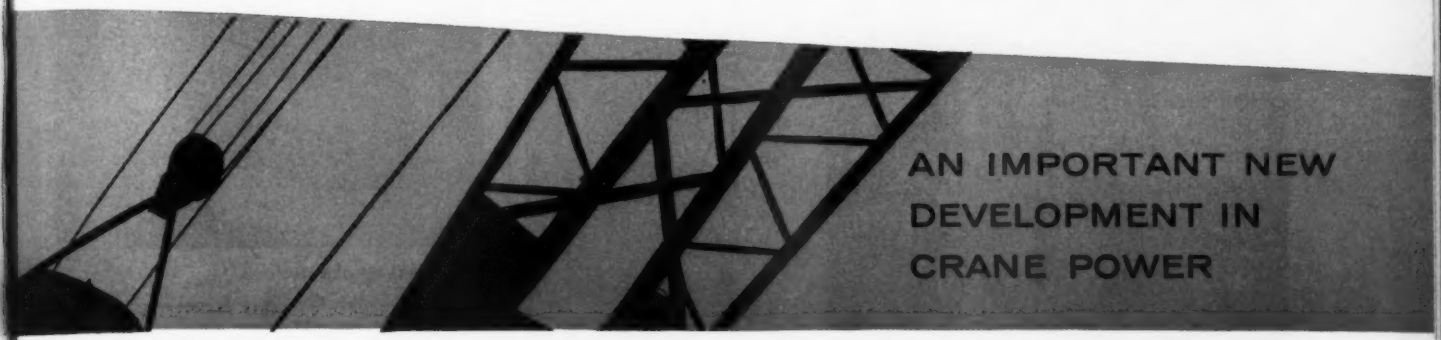
CERAMIX, a new type of wall surfacing finish, was applied on both interior and exterior walls of the Long Island's Wyandanch station. The coating is an epoxy glaze which is said to be a non-oxidizing material that cures to a glass-like impervious finish.

News briefs in pictures

BUTT WELDS are being made in track by the C&O to test a process developed by Camille Boutet, a French engineer. Called alumino-thermique rail welding, it involves igniting a patented compound placed in a hopper over a mold around the rail ends. The mixture becomes molten and flows into the mold to fuse with the pre-heated rail ends.

A NUCLEAR POWERED switch lamp has been installed by the Pennsylvania to determine the adequacy of its light intensity under service conditions. The lamp, manufactured by the U. S. Radium Corporation, utilizes radioactive Krypton 85 gas. The gas reacts with a phosphorescent coating to produce a glow which is expected to last effectively until 1969 without refueling. The self-contained lamp is 12 in square, and has glass lenses, two red and two green. It is made of heavy steel plates welded together to form a tightly sealed case. Behind each lens is a glass bulb, about ¾ in. in diameter, which contains the radioactive gas. Said C. J. Henry, the road's chief engineer: "At present it costs us about $900,000 a year just to service our 14,000 kerosene and electric switch lamps, so a nuclear lamp which requires almost no maintenance could mean substantial savings." The nuclear switch lamp is installed near the road's test laboratories in Altoona, Pa.

announcing



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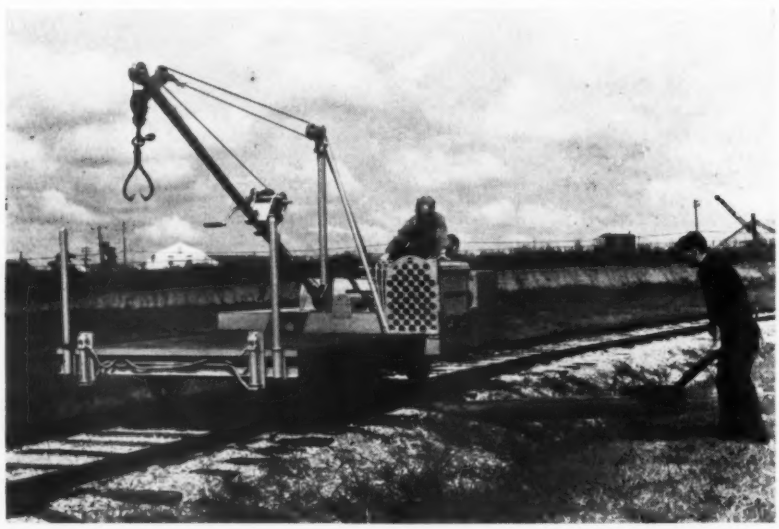
Products

More power for 1959 . . .

Track maintainer

THE 1959 MODEL of the Jackson Track Maintainer, now in production, incorporates a number of improvements, according to an announcement by M. S. Westlund, vice-president of the company. Among the major changes from the 1958 model are much more powerful vibratory motors which are said to deliver 6000-lb blows at the rate of 4200 per minute to the tamping bars. Electric current is now supplied by a new single-generator simplified power plant of more than ample capacity, it is said. According to the announcement, the increased vibratory energy produced by the larger motors materially speeds the machine's ability to consolidate ballast uniformly over the entire range of production tamping and results in appreciable gains in footage since, it is said, fewer insertions of the tamping blades are required.

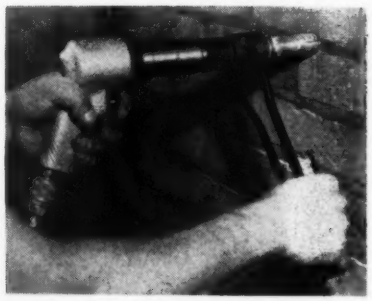
Also, a spot-tamping jack assembly, controlled by the operator, is offered optionally on the 1959 model. *Jackson Vibrators, Inc., Dept. RTS, Ludington, Mich.*



Tie inserter added to . . .

Track crane

TIES can now be inserted in track by the Kershaw Track Crane, according to the manufacturer. The crane has the tie-inserting mechanism built into it. The machine is also used to redistribute new ties, pick up surplus old or new ties, or stack old ties into piles. *Kershaw Manufacturing Company, Dept. RTS, Montgomery, Ala.*



Fast drilling claimed for . . .

Air hammer

EXPANSION anchors can be quickly set into masonry with the use of a new compact, light weight air hammer, according to the manufacturer. The Model SP-500 weighs 4 lb and has a metering trigger for controlling blows from 0 to 2200. It operates on 11 cfm at 90 psi. The hammer can set anchors up to ⅞ in. in diameter, it is claimed. *Superior Pneumatic & Manufacturing, Inc., Dept. RTS, 4758 Warner Rd., Cleveland 25, Ohio.*

Light weight is feature of . . .

Air compressor

WEIGHING 2250 lb the Le Roi 125 cfm rotary portable air compressor is claimed to be the lightest and slowest (1600 rpm) of its type on the market. It is the fourth of the manufacturer's new line of rotary air compressors. The new 125RG2 is rated at 125 cfm of free air compressed to 100 psi. It is a sliding-vane type two-stage compressor with an in-line cylinder arrangement. Power is supplied by direct drive from a wet-sleeve overhead valve engine. The carriage is a welded steel frame of unit construction and has a three-point suspension. The steel housing is lockable and has full length tool boxes. The towing eye on the drawbar can be quickly replaced by a ball socket hitch, it is claimed. *Le Roi Division, Westinghouse Air Brake Company, Sales Promotion Department, Dept. RTS, Milwaukee 1, Wis.*

What's the answer?

To be answered in March

Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you'd prefer that your name be withheld, we'll gladly comply.

DEADLINE: January 31

1. Why is it necessary to build railroad tracks with the joints staggered at the midpoints of the opposite rails? What are the advantages or disadvantages of having the joints opposite any other point of the rails as long as the joints are not supported on the same ties? Explain.

2. When using a pile hammer suspended from the boom of a crane, what measures should be taken to insure vertical driving? Describe fully.

3. Is it practicable to keep rail-and-flange lubricators in service during winter months when heavy snow conditions exist? Explain.

4. What are the advantages or disadvantages of having one heating plant serve two or more buildings? Explain.

5. When spotting track with a production tamper, what precautions must be taken to prevent leaving "hanging" ties behind the work? Should the practice of spotting track be abandoned in favor of making light out-of-face lifts? Explain.

Send answers to:

What's the Answer Editor
Railway Track & Structures
79 West Monroe Street
Chicago 3, Illinois

Do you have a question you'd like to have answered in these columns? If so, please send it in.

Corrosion of bridge members

What is the best method of preventing or retarding deterioration of floorbeams and other undertrack members of through girders and trusses exposed to brine drippings? Describe.

Painting helps

By E. W. PRENTISS
Engineer Bridges & Buildings
Pennsylvania
Philadelphia, Pa.

I know of no method of satisfactorily solving this problem. At the present time there appears to be no protective coating which holds up. Considerable research is being done and it is to be hoped that ultimately a solution will be found. In the meantime, it will be helpful to keep the members painted with a good grade of paint. Cleaning and preparation of the surfaces is very important and sand-blasting is preferred. It is recognized that this is costly but is much less so than welding repairs. Mastic coatings have been used with some success.

The use of tins or plywood to divert the brine has been of some help. We have had some success by boxing in the entire depth of a floorbeam, on the side facing approaching traffic, with plywood.

The development of some material to replace the brine, but which would not be corrosive, would be very helpful. It is believed that the use of mechanical refrigeration is gradually reducing the amount of corrosion through elimination of the brine.

Keep coated

By C. E. O'CONNOR
Engineer of Bridges
New York Central System
Cleveland, Ohio

On through-girder and truss spans subjected to brine action, the deck should be provided with brine blocks between ties, so located and arranged as to carry the brine out and away from the steel. This will prevent the brine from coming in contact with the stringers.

Floorbeams, which are more difficult to protect than stringers, are generally treated with a No-Ox-Id coating. On occasion, they should be provided with splash boards, suspended out from the floorbeams, to prevent the brine coming in contact with the floorbeam flanges and web outside the ends of the ties.

For structures on curves where superelevation is involved, especially at yard entrances or other points where trains make frequent stops or are switched, it is generally advisable to use acid-resisting alloy-steels or sections considerably heavier than what might otherwise be found necessary.

All sections subject to brine action should be kept protected with a No-Ox-Id or other coating which will retard brine action.

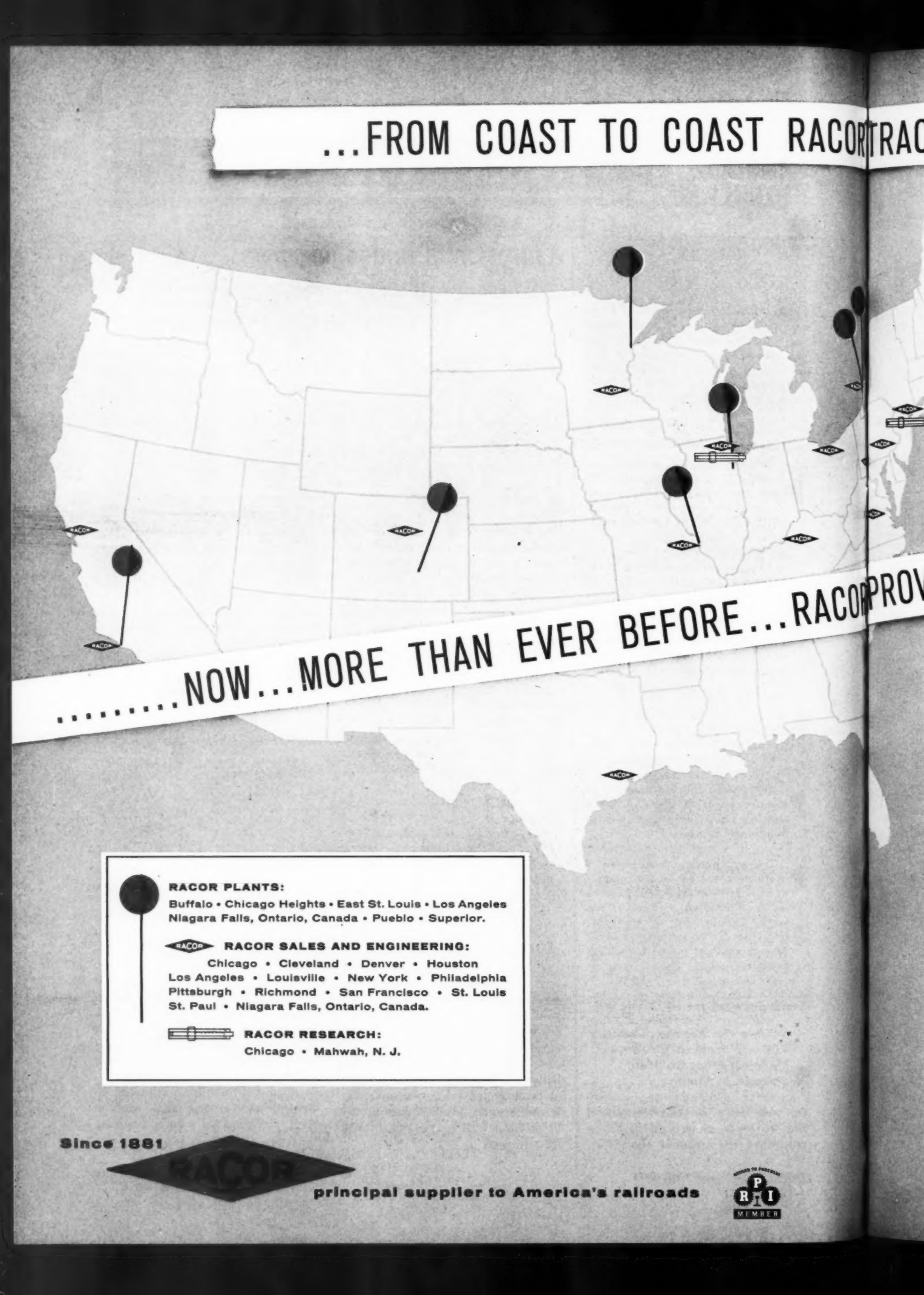
Still uncertain

By E. S. BIRKENWALD
Engineer of Bridges
Southern System
Cincinnati, Ohio

Preventing corrosion of steel railroad bridges from brine drippings is still uncertain, notwithstanding the research and service tests made during the last five or six years. The degree of prevention or retardation of corrosion will depend entirely upon the method used to prepare the steel before coating or painting and local conditions, such as the frequency of trains during the work period and the number of cars that drip brine during this period.

Obviously, the best results toward prevention or retardation of deterioration will come from removing or neutralizing the brine already on the steel. This can be accomplished by

(Continued on page 44)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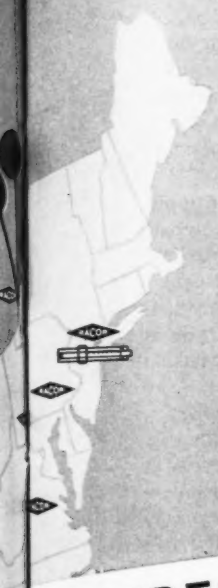

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What's the answer? (cont'd)

(*Continued from page* 41)

steam cleaning, sand blasting or hand cleaning. So far, according to service tests, chemical means of neutralizing the brine appear to be inferior to the three methods just indicated. While hand cleaning is not as effective as either sand blasting or steam cleaning, since it is necessary to touch up the coating or paint sooner, it is considerably cheaper.

A number of synthetic resin paints are on the market which show promise of providing a long-life paint system that will stand up against brine drippings. No conclusions have been reached as to the type of synthetic resin paint which may be most effective.

Until a suitable paint system can be found, which will justify its use economically, it would appear that hand cleaning the steel and using a petroleum coating containing a rust inhibitor is the cheapest means to arrest corrosion from brine drippings.

Uses bridge cement

By W. R. BJORKLUND
District Engineer
Northern Pacific
St. Paul, Minn.

To obtain satisfactory adherence to steel floorbeams and other under-track structures, it is essential that the surfaces of such steel members be cleaned, brushed, sandblasted, or flame-cleaned prior to the application of a protective coating. In general, we make an application of bridge cement over the entire top surfaces of floorbeams and stringers at the time of the renewal of bridge ties. This provides adequate protection under the tie area. The intervening spaces may be coated with bridge cement usually at the same time the structure is repainted.

We have had good success with a type of bridge cement manufactured at our company-owned waste-reclaiming plant. This is a grease type cement which is cheap, easily applied, and very protective. The material is spread on with a trowel to a minimum thickness of 1/20 of an inch over the entire surface. The material, of course, should not be applied in wet or freezing weather.

Three years ago we made an application of a neoprene protective coatin on a particularly troublesome bridge. The beams of this structure were super-elevated on a curve which permits the brine drippings to lie in the pocket created on the upper side of the beam in the flange angles. The neoprene paint, which was applied in four separate coats, including a primer, has given excellent results to date. However, the three-year interval since its application is probably not sufficient to determine if it will be used to any further extent.

Removing efflorescence

How can the efflorescence on brick walls be prevented? What remedial measures are practicable? Describe.

Stop moisture penetration

By S. E. KVENBERG
Supervisor Building Maintenance
Milwaukee Road
Chicago, Ill.

Efflorescence on brick walls is, of course, caused by a sufficient amount of moisture penetrating into the structure of the brick to dissolve the salts in the clay and bring them to the surface. There they remain in crystalline form after the moisture has evaporated.

It follows then that the only effective preventative measure is to keep moisture from penetrating into the structure of the brick.

A wall can be saturated from a number of sources, the most common of which are porous exterior face brick, defective or weathered mortar joints, defective parapet walls, defective roof, roof flashing and gutters, damp basements and leakage of interior water and steam lines.

The first step towards remedial measures is to determine the source of moisture and then do what is necessary to eliminate it. If it is determined that lack of ordinary maintenance is not the cause and that moisture is penetrating through the exterior face of the brick, there are a number of waterproofing materials on the market in either clear or pigmented form which, when applied by brush or spray, will effectively seal the wall surface for a period of time. A job of this kind is not necessarily permanent and may have to be done at regular intervals to keep the wall surfaces waterproof.

Reduce contributing factors

By J. W. HAYES
Architect
Great Northern
St. Paul, Minn.

Efflorescence on brick walls is a white deposit of water-soluble salts either upon the surface or within the pores of masonry.

Since efflorescence upon the surface of the masonry mars the appearance of the structure, this type is usually considered the most objectionable. However, while it is an unsightly nuisance, it is by no means as harmful as the effloresent crystal pressure resulting from deposits within the pores of the masonry. Most masonry disintegration is caused by this pressure.

The factors essential to the formation of efflorescence are: (1) water-soluble salts in the masonry; (2) water in contact with these salts for sufficient time to take them into solution; and (3) a construction which permits the solution to migrate to the surface of the masonry or to other locations where the salts are deposited upon evaporation of the water.

Obviously, if masonry which contained no water-soluble salts could be constructed, or if no water penetrated the masonry, efflorescence would not occur. However, in masonry exposed to the weather, neither of these conditions can be met completely. Consequently, the practical approach to the elimination of efflorescence is to reduce all contributing factors to a minimum. The following procedures are recommended as a means to that end:

(*Continued on page* 48)

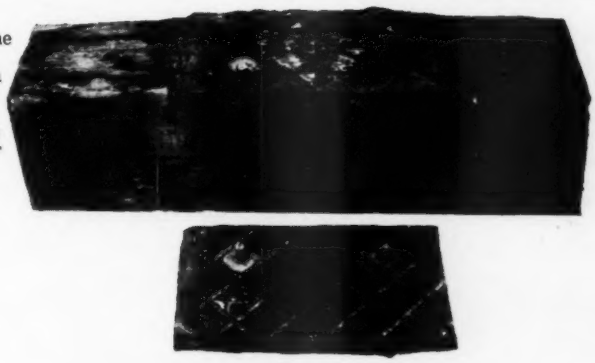
PROOF THAT BIRD SELF-SEALING TIE PADS

Extend bridge tie life by at least ten years

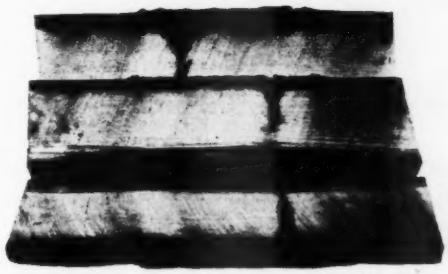
After 10 Years' Protection: This 8" x 16" bridge tie has been protected for 10 years by Bird Self-Sealing Tie Pads. Pad is still securely sealed to the tie to prevent even the slightest penetration of moisture or abrasive materials. The beading at the edges of the pad is characteristic of Bird Tie Pad performance.

These unretouched photographs of a bridge tie dramatically illustrate the underplate protection afforded by Bird Self-Sealing Tie Pads. Life of the *preceding* deck on this bridge at Akron, Ohio, was 19 years. When the deck was replaced in 1948, Bird Self-Sealing Tie Pads were installed. The sound condition of the ties today, after 10 years, indicates *at least* a 50% increase in their life expectancy beyond that previously obtained without the protection of Bird Self-Sealing Tie Pads. Write for interesting booklet to Bird Tie Pads, East Walpole, Massachusetts, Department HTS.

Pattern Bottom Plate: This is the same tie, halved and slabbed. Note imprint of pattern bottom tie plate on the pad. *Bird Self-Sealing Tie Pads give the same rugged, lasting service when used with either pattern-bottom or smooth-bottom tie plates.*



Under-Plate Protection: Slabbed sections of the halved tie show the excellent condition of under-plate and spike hole wood after 10 years' protection by Bird Self-Sealing Tie Pads.



PHOTOS COURTESY OF ERIE RAILROAD

Bird Self-Sealing Tie Pads are Recommended for:

BRIDGE DECKS • CURVES • SWITCH TIMBERS • HIGHWAY GRADE CROSSINGS AND OTHER PAVED AREAS • CROSSING FROGS • INSULATED JOINTS • WITH SMALLER TIE PLATES • PILE CUTOFFS • THROUGH STATION PLATFORMS • OUT-OF-FACE INSTALLATIONS IN RAIL LAYING PROGRAMS • SANDY LOCATIONS • ALL OTHER LOCATIONS WHERE TIE LIFE IS SHORT OR REPLACEMENT COSTS HIGH.

Best... BIRD & SON, inc. Established 1795 *Buy BIRD*

NEW CONCEPT IN TRACK

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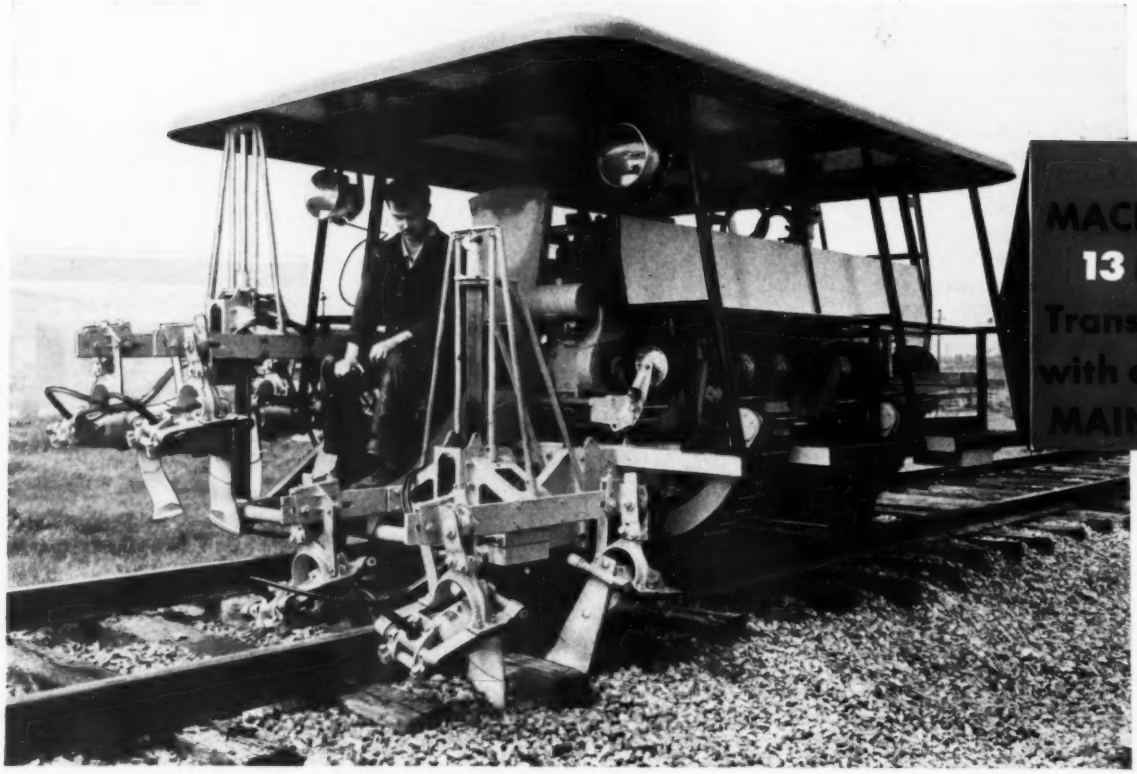
Greatly Lowers Maintenance Costs



A COMPLETE UNIT—all three machines (or other equipment) are housed in Main Car.

RAPIDLY REMOVED FROM TRACK by Crawler Set-Off . . . in a matter of seconds.

POWER DOWNFEED OF INDEPENDENT WORKHEADS . . . operates easily.

HYDRAULIC PROPULSION . . . the Main Car travels up to 25 MPH.

THESE HYDRAULIC MACHINES are *easily* loaded on or unloaded from Main Car, by hydraulic Tail Rack.

LOOK WHAT THE MULTI-GANG WILL DO:

surface • line track • pull spikes without bending • remove or insert ties • torque controlled bolting • drills rail
MULTI-GANG'S Main Car is 171″ long x 113″ wide x 84″ high.

TAMPER MULTI-GANG PACKAGE UNIT

consists of:
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Hydrillbolter
Spike Hydrejector—Tie Hydrenewer
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MULTI-GANG UNIT EXTENDS THE TRACK SECTIO

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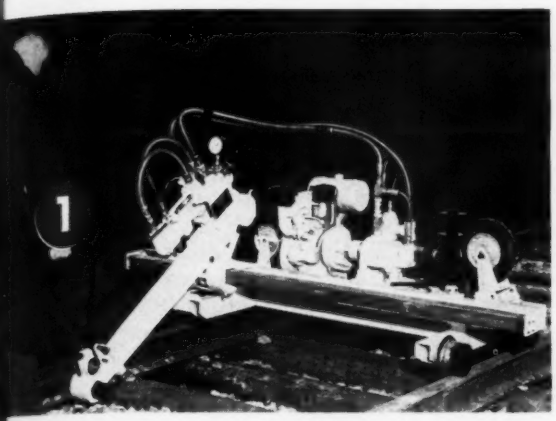


HYDRILLBOLTER* (*Model* BD)

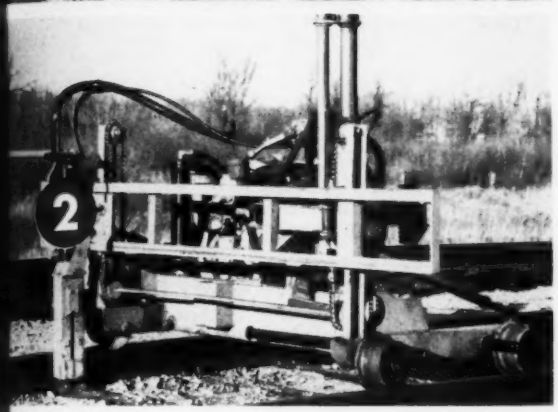
Combination Bolter and Rail Drill

Hydraulic Transmission
Minimum Mechanical Replacement Parts

BOLTER
- single control lever, manned by one operator
- automatic change from high speed, low torque, for 'running up' nuts to low speed, high torque for nut tightening
- handles nuts on either side of both rails

DRILL
- drill attachment adapted in less than 2 min.
- manned by one operator
- easily adjusted for different rail sizes
- drill bits quickly interchanged

HYDRILLBOLTER can be removed from track by two men.



SPIKE HYDREJECTOR*

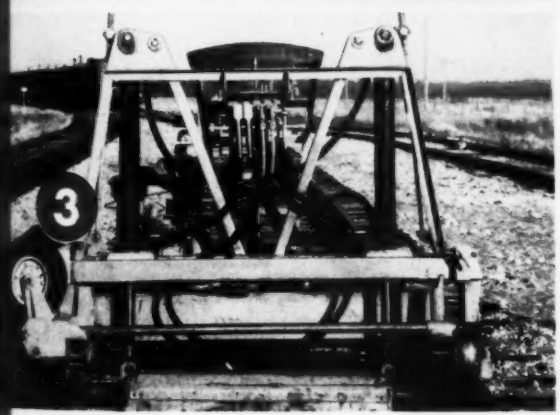
TIE HYDRENEWER* (*Model* PR)

Combination Spike Puller and Tie Renewer

pulls spikes without bending • lightweight • completely hydraulic • easily operated by one man.

Tie Renewer is adapted to Spike Puller in seconds
No disturbance of track line or surface
Renews without digging out tie ends

Removed from track by one man.



COMBOLINER* (*Model* JL)

Combination Powered Jack and Track Liner

powerful • lightweight • compact

- 10,000 lbs. thrust to throw the track in either direction
- simply insert lining anchors and slide out wheels to line the track
- lifts track to 10 inches, rail dogs engage automatically
- turntable allows easy pivoting
- cross level indicator reads directly in inches of elevation
- no wheels, axles to interrupt view of rails

Easy to remove from track.

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**Patents Pending*

What's the answer? (cont'd)

(*Continued from page* 44)

(1) Selection of facing brick should be made with consideration to its rate of efflorescence. This rating should be no more than "slightly effloresced" and may be determined by the wick test as included in ASTM Specification C-67.

(2) Back-up masonry should also rate no more than "slightly effloresced," as determined by the wick test. If the efflorescence exceeds this amount, contact between the back-up and facing should be broken by flashing or cavity-wall construction.

(3) Mortar cements tend to contribute to efflorescence, especially those high in alkaline content. It is desirable to test the mortar proposed to be used by the wick test. The addition of barium carbonate to mortar, in the proportion of 3 to 6 lb of carbonate per sack of cement, will reduce efflorescence. Calcium stearate, when added to the mortar in the proportion of .02 per cent of calcium stearate by weight of the combined cement and lime, will retard penetration of moisture by capillary action. This also will reduce the tendency of the wall to effloresce.

(4) Adequate protection should be provided for all masonry trim, such as window sills, copings and band courses, to prevent efflorescence caused by excessive saturation of the masonry. This protection should be at least 1 in and a V-slot provided on the under side.

(5) Through flashing should be installed in exterior walls approximately 6 in above grade and under all sills and copings and over all heads of openings.

(6) Condensation within building walls is also an important contributing factor to efflorescence. This may be prevented by the following methods:

(a) Provide a vapor barrier on the warm side of the wall.

(b) Provide venting of the cold side to the outer air.

(7) Colorless waterproofers may be used when there is reasonable assurance that sufficient water will not accumulate within the walls to cause a salt solution to migrate toward the surface.

Seal the joints

By M. W. Clark
Assistant Chief Engineer
Atlantic Coast Line
Wilmington, N. C.

Masonry walls, particularly in the coastal regions and in damp places, such as in cellars, are frequently disfigured by the formation of efflorescence on the surface. This deposit generally originates in the mortar and it frequently spreads over the entire wall.

We have attempted to overcome this condition by providing considerable through-wall flashings and by using a waterproofing compound on the exterior walls. We are also specifying Brix-ment mortar mix as we find we can secure a more uniform mix. However, we do think that a portland-cement mix would afford the best protection, provided a good uniform mortar could be obtained. In addition, it is absolutely necessary that brick, concrete block, etc., be laid in a full bed of mortar with head joints shoved to make them solid, and all joints tooled to make the mortar as dense as possible to reduce the entrance of water.

In old structures the efflorescence should be removed, joints pointed, and a good quality waterproofing compound applied to the entire exterior, giving particular attention to the joints. All flashing should be carefully examined and renewed where necessary. On some of our older buildings where mortar joints were particularly bad, we have cleaned the loose material from the joints and then applied a stucco coat with a shotcrete machine.

B&B inspection with track supervisor

When the B&B supervisor goes on his regular inspection trip is there enough advantage to justify having the track supervisor take time from his own work to accompany him? Explain.

Better job together

By L. B. Cann, Jr.
Chief Engineer
Richmond, Fredericksburg & Potomac
Richmond, Va.

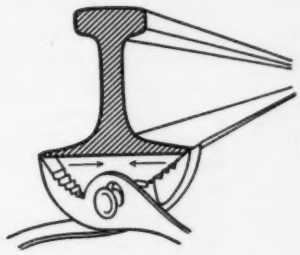
We believe it is of great advantage for the track supervisor to accompany the bridge and building supervisor on his bridge inspections. We believe that collectively they do a better job, with definite benefit to the railroad company. On many railroads the track supervisors are young engineers who are learning railroading from its foundation up. In later years these men may be advanced to assistant division engineers or division engineers, at which time they have the responsibility for the maintenance and construction of the bridges and culverts on their district.

It has been the practice on many railroads to make a definite distinction between the responsibility of the track supervisor and that of the bridge supervisor. Sometimes, this is to the extent that neither know what the other is contemplating in his program for the same territory and just how the work is to be performed. This cleavage is definitely not to the best interests of a well-maintained railroad. The track supervisor is responsible for the maintenance of the actual track over bridges and particularly over solid-deck bridges. In many cases most of the rough track occurs at the receiving or leaving ends of a bridge and is attributed to the poor tie condition on the bridge or soft spots under the shore ties immediately adjacent to the bridge. The forces assigned to track supervisors, or trackmen, are required to keep the bridge clean and to remove brush, weeds and other fire hazards from around the bents, piers, abutments and head walls.

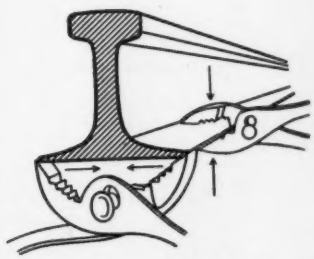
Some managements may take the position that the track supervisor has enough of his own work laid out for him and should not be required to

Here's how the BULLDOG anchor's two-way grip multiplies holding power

Compare the BULLDOG's holding power with any other anchor:



Most rail anchors grip the rail base like a single pair of giant pliers—with horizontal force.



The BULLDOG anchor grips the rail base like *two* giant pairs of pliers—with both horizontal and vertical force. Also, because of the integral design of the BULLDOG's two factory-assembled elements, the vertical force of the clamp maintains and sustains the horizontal force of the spring.

Listen to an engineer on stresses:

"Most rail anchors are simple one-piece torsion springs. They have a built-in resistance to distortion which is the force that grips the rail base. This horizontal force is similar to a giant pair of pliers squeezing the rail with constant pressure.

"The True Temper BULLDOG is also in effect a one-piece anchor because it is shipped, handled and applied as one piece. But it is manufactured in two pieces to provide two-way holding power.

"First, a spring is formed from resilient spring steel. It functions as other anchors described above—to grip the rail horizontally. Second—and here is where the BULLDOG is unique—a double-jawed clamp of hardened steel is fitted to the spring to add vertical force which grips the rail at the flange of the base. The over-all effect, to illustrate very simply, is that of two giant pairs of pliers—one gripping horizontally, one vertically.

"But the pliers analogy does not tell the whole story. The two pieces of the BULLDOG anchor, because of their integral design, actually multiply and sustain the gripping power of each other because they provide leverage for each other."

If you'd like to test the BULLDOG on your road, or if you'd like more information on how this amazing anchor can cut your track maintenance costs, contact your True Temper representative or write True Temper, Railway Appliances Division, 1623 Euclid Avenue, Cleveland 15, Ohio. No obligation, of course.

OTHER TRUE TEMPER RAILWAY PRODUCTS: BULLDOG Ballast Forks, Weed Cutters · BULLDOG Shovels · BULLDOG Safety Rail Forks, Hammers, Sledges · BULLDOG Scythes

TRUE TEMPER® BULLDOG RAIL ANCHORS YOU CAN LOOK TO TT FOR LEADERSHIP

devote any of it to accompany the bridge and building supervisor on a bridge inspection. However, inspections are not necessarily too time-consuming and not necessarily performed on a continuous basis, but could be set up for one or two days per week and processed until the entire inspection is completed.

Much has been written about harmony between engineering departments and transportation departments, whereas there exists a lack of harmony between the subdepartments of the mainteance-of-way department itself. If these joint inspection trips accomplish nothing else, they certainly tend to create a better understanding between the two subdepartments of their problems, and point the way to their solution.

For specific work

By W. P. Clark
Division Engineer
Lehigh Valley
Jersey City, N. J.

Since the B&B department territory has been considerably lengthened in recent years on our railroad, the B&B supervisor does not make any regularly designated inspection trips such as were made years ago. However, as required, he does make certain specific inspections, some of which would justify having the track supervisor accompany him. But, due to the length of the territory, it is quite impossible for him to plan these inspection trips in advance so that the track supervisor can do so.

Joint inspections are made by both supervisors in connection with retieing bridges and turntables, roadway and tunnel work. On these inspections, which are specific trips, it is practically necessary they be made jointly.

Has several advantages

By L. C. Cantwell
Supervisor B&B
Norfolk & Western
Portsmouth, Ohio

We think that the benefits derived from having the supervisor of track accompany the supervisor of bridges and buildings on his inspection trip, justify the time and expense because:

(1) Joint inspections of bridges, culverts, buildings and track are beneficial to both supervisors, because we consider the maintenance of these structures and track a joint responsibility. It is good policy to have the supervisors working as a team, advising and suggesting methods of approach for maintenance of both track, bridges and buildings.

(2) On our railroad, track supervisors have less territory than the supervisor bridges and buildings, and they have contact with practically every structure on their territory either personally or through their foreman. Hence, they have more opportunity to observe any hazards or defects in structures on their territory and can call attention to any changes in conditions on inspection trips.

(3) Periodical inspections by supervisors of track and supervisors of bridges and buildings give an opportunity and time to make thorough inspections as well as to discuss methods of repairs, work procedure, and needs of the various subdivisions.

(4) The expressed opinions of the track supervisors on trips of inspection have proven beneficial to the general inspectors and to the bridge supervisors.

Not practical

By W. A. Schubert
Division Engineer
St. Louis-San Francisco
Chaffee, Mo.

It would not be practical for the track supervisor to accompany the B&B supervisor on his regular inspection trips. The work of the B&B supervisor is more of a specialized nature and inspection may be set at a fixed date. The duties of the roadmaster involve a broader field, which may change his tour of inspection at a moment's notice. Thus, it would be difficult to line up a joint inspection on regular inspection trip made by the B&B supervisor.

There certainly should be the closest cooperation between the B&B supervisor and track supervisor because their work is closely related.

A general inspection of bridges, buildings and all other structures is made on this railroad during the annual spring bridge inspection by the division engineer, general foreman B&B-WS and roadmaster, and plans are made for improvements or repairs. These joint inspections by the B&B supervisor and roadmaster are only on specific jobs.

Not any more

By A. W. Carlson
Engineer of Bridges & Structures
Western Pacific
San Francisco, Calif.

For many years it was our practice to have the roadmaster or track supervisor accompany B&B personnel on bridge inspections. In recent years, however, this procedure has been discontinued because it was felt that insufficient advantage was gained to warrant taking the track supervisor away from his normal duties.

With the increased need for supervision, resulting from the change-over to mechanized track forces and the expansion of maintenance districts, the time of a roadmaster or track supervisor is tightly scheduled. To accompany the B&B forces during inspections of bridges and structures requires two to three weeks on various parts of the system. Keeping the track supervisors away from their activities for this period of time is not justified in our opinion.

The duties of the track supervisor in connection with bridge work are relatively minor. His functions are to keep water barrels filled where they are used, to keep approaches up, place and maintain approach rail anchors and to insure that no drift or combustible material is lodged in the stream bottoms or against the structures. If any of the above conditions exist, he is no doubt aware of them, since he travels over his district on the rear ends of trains and by motor car several times a month. He would arrange to have them corrected.

The B&B supervisor and his subordinates inspecting a long bridge spend a great amount of time under and around such a structure. To have the track supervisor or roadmaster standing on top of the bridge merely waiting to move on to the next structure is not using his time to the best advantage. This is contrary to any maintenance program which endeavors to utilize experienced and skilled employees efficiently.

What's the answer? (cont'd)

Checking gages and level boards

How often should track gages and level boards be tested for accuracy? How should this be done?

Check level every day

By F. H. McKenney
Engineer of Track
Burlington Lines
Chicago, Ill.

Track gages used by sectionmen in track maintenance are sturdily constructed and are not likely to be inaccurate unless they are mechanically damaged. Master gages are maintained for testing track gages, and rules provide for semi-annual checking. If there is any question of the accuracy of a track gage, it may always be checked with a steel tape.

Track level boards should be checked every day by the foreman. They can be knocked out of adjustment by a heavy jar or by dropping. They are easily adjusted by means of the adjusting screw located on the plate at one end of the level tube. One way to make the test is to place the board across the track where the bubble indicates level. Then turn the board end for end and observe whether the bubble is still indicating level. If not, turn the adjusting screw to bring the bubble half way back to center. Then repeat by selecting a level spot and again reversing the board. It should then show level in both positions.

Test levels twice daily

By C. P. Martini
Roadmaster
Soo Line
Stevens Point, Wis.

Up until rather recent times it was the duty of the roadmasters to check and make a report as to the accuracy of the gages used by the section foremen, and this was done at stated periods. Now that the pullout type 6-ft and 8-ft rulers are cheap and most every foreman carries one, the

(Continued on page 56)

NOW... SAVE UP TO 13,000 SPIKES PER MILE

... reduce tie splitting from excessive spiking

GAGE LOCK SPIKES

Two Gage Lock Spikes to a plate do a better holding job than 4 cut spikes on tangents and light curves. Fewer spikes are driven — causing less tie damage and permitting a saving of nearly 13,000 spikes per mile. The Gage Lock Spike is a plate fastening as well as a rail spike. It has an indented throat, offset at the tie plate surface. Result: thrust and wear are avoided from the edge of the rail base.

TIE PLATE LOCK SPIKES

Both the Tie Plate Lock Spike and the Gage Lock Spike hold the rail to gage and avoid plate cutting. When driven to refusal, the spread shank is compressed and binds against the walls of the hole with spring pressure. Play is eliminated — plates are held against movement — rail is held to gage and plate cutting is avoided.

RAIL LOCK SPIKES

Rail Lock Spikes offer the same design as Gage Lock Spikes, but are not offset at the plate surface. The throat protrudes 1/16"—resultant pressure binds the spike against the rail base edge. Play is eliminated between the tie plate shoulders — the rail is held to a true gage.

Forward-looking management can extend the cycle of track structure by using Lock Spikes. One regaging operation costs more than the initial cost of installing Lock Spikes. Specify spikes having a low annual cost—Specify Lock Spikes.

GAGE LOCK SPIKE

TIE PLATE LOCK SPIKE

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STAY UP...

TAMP WITH A

McWILLIAMS

Track raised and tamped using a McWilliams Multiple Tamper will extend surfacing cycle by 30% or more over other machines now in use.

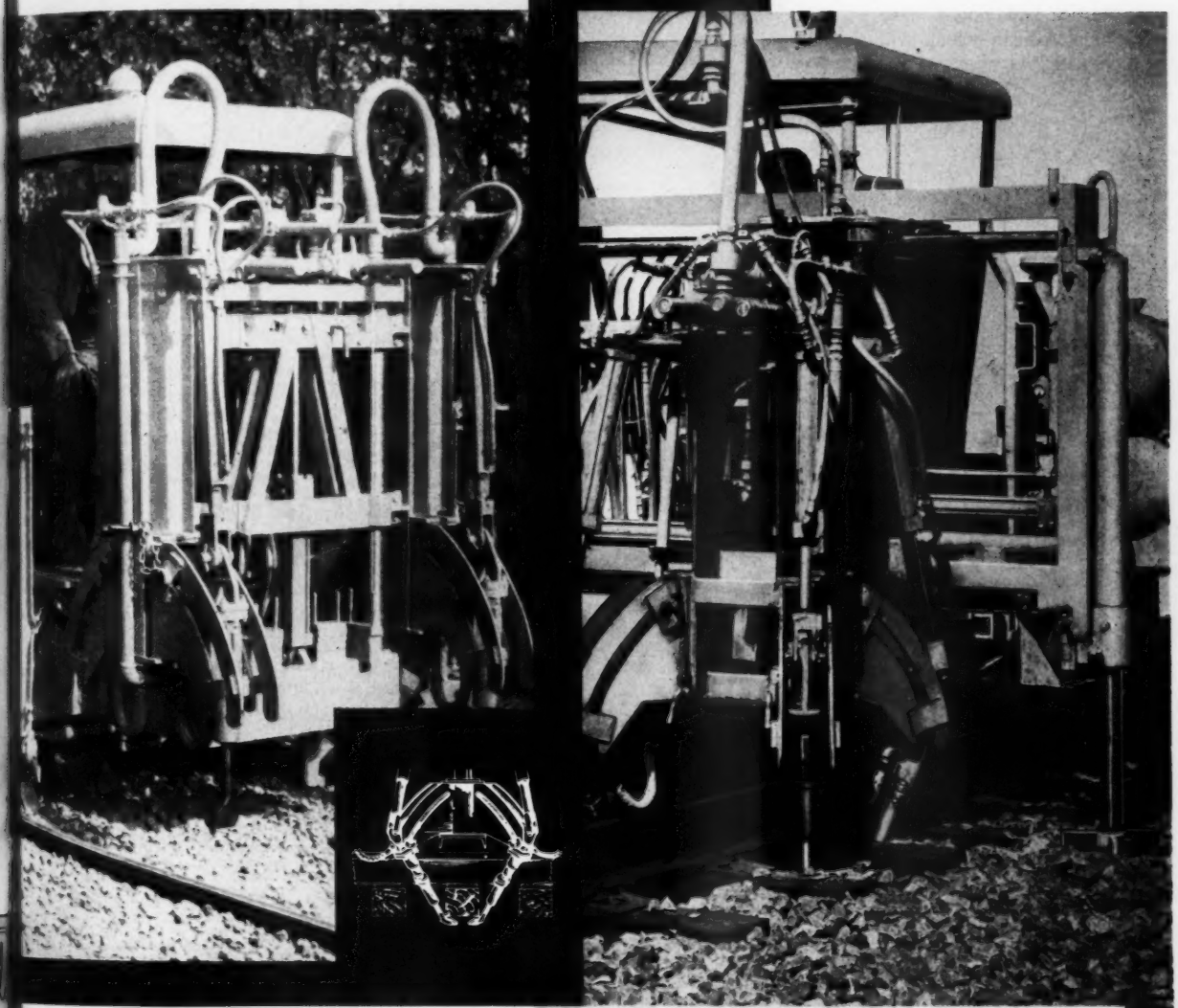
McWilliams Multiple Tamper

These fundamentals, all pioneered by Railway Maintenance, are the main reasons why track stays up longer when tamped with a McWilliams: effective tamping under the rail-bearing area of the tie . . . split head design . . . tamping *pressure and impact* under control of the operator.

Now Available with Integral Hydraulic Jacks.

McWilliams Jack Tamper

The only machine that will raise and tamp track . . . and which will hold established grade, keeping ahead of one or two production tampers.



McWilliams Spot Tamper

Providing big-tamper ballast compaction, this brings a new level of economy to spot surfacing . . . yard and terminal maintenance . . . and to general tamping on smaller railroads where the cost of production tampers cannot be justified.

Railway Maintenance Corporation

PITTSBURGH 30, PA.

What's the answer? (cont'd)

(Continued from page 52)

checking of gages can be done easily.

One simple way is to use the gage in question on some track until a spot is found where it will just fit. Then use one of the pull-out steel rulers and measure the gage of the track at that point.

Almost all track level boards have an adjusting mechanism which will adjust the bubble. This usually is a set screw close to the bubble. A level board can be checked easily by finding a spot where the track shows level on the level board in question, and then reverse the board on the track end for end. If the bubble still shows level, the board is OK. If not, the bubble should be adjusted so that it will show the same reading regardless of what end of the board is on which rail.

If the board does not read right and cannot be adjusted, it should be replaced right away. There is no quicker way to spoil a piece of track than to attempt to correct level with a board that is not properly adjusted.

Manganese-frog welding factors

What factors are used to determine when it is no longer economically feasible to weld manganese frogs? Explain.

Several considerations

By V. R. TERRILL
Supervisor of Welding
Boston & Maine
Boston, Mass.

We long ago recognized that the adoption of a general procedure to follow in scrapping or welding frogs would be extremely difficult. A frog in one location may last through many weldings. The same frog in another location would need to be scrapped after a few welds.

Besides location, it must be remembered that different welders will employ different procedures. Various welding procedures play an important part in the life of the frogs, particularly with manganese frogs. Because of the factors involved being so varied as to location, procedure, etc., we decided to set up a system whereby we could treat each frog with the same set of rules. These rules are only applied to questionable frogs, however. That is, our welders are assigned over the system and weld frogs in track as necessary. When they find a frog that cannot be completely welded because of the size of the failure, they make the frog "safe" and write it up for removal.

This removal letter is addressed to the track supervisor, with copies to the welding supervisor and welding-shop foreman. The letter advises the track supervisor that the frog has not been completely repaired and that a replacement frog should be obtained as quickly as possible. The copies further advise the shop foreman and welding supervisor as to the condition of the frog and why it can not be completely welded in track. The shop foreman then prepares and sends a replacement frog to the track

supervisor. When the frog which has been "written-up" is received at the shop, the foreman already knows what to look for.

Since this is our system, we now must determine the economics of welding a frog or replacing it with a new one. The shop foreman has the frog stripped of inserts and heel rails and it is cleaned, if necessary, for an external inspection. Right here we may determine that there are too many cracks throughout the casting to warrant the expense of welding. If the frog gets by the external inspection, the grinder prepares the frog by grinding out the "seal" that the field welders had put in, and any other breaks or cracks that can be found.

It is characteristic of manganese that the weakest area is that part of the parent metal adjacent to the weld. It follows that a frog that has been welded a number of times, let's say eight or more, doesn't warrant extensive repairs. We would scrap this frog if it required prolonged welding.

If the frog has not been welded many times, then repairs costing up to half the cost of a new frog are made. This figure, of course, is comprised of welding labor and material. The cost to remove the frog is not charged to repairs because, whether the frog is welded or scrapped, it must be replaced.

Start welding promptly

T. L. Biggar
General Supervisor Track
Chesapeake & Ohio
Richmond, Va.

There are several things to consider when determining when it is no longer economically feasible to weld a manganese frog.

One side of a turnout usually carries about 90 per cent of the tonnage; therefore, the wear is uneven. This wear can be taken care of by a welder for quite some time.

A very small percentage of the area of a car wheel actually comes in contact with the rail. The portion that does not come in contact with the rail is usually rough. Where a wheel passes over a frog the rough or outside part of the tread carries the load for a short distance. This is what causes wear on a frog as well as wear on the turnout side of stock rails.

After a frog wears to a certain point it will start to mash out on the wing side. This should be built up by a welder as soon as the mashing is noticed. This kind of wear can usually be corrected at least a half dozen times in the field. After several repair jobs the frog will usually break near the point of weld. I would not recommend welding a break the second time in high-speed territory.

Lists four factors

J. D. Case
Assistant Superintendent
Maintenance Equipment—Welding
New York Central System
Cleveland, Ohio

This question includes several different conditions, such as rail-bound-manganese frogs in high-speed tracks, solid-manganese frogs in medium or low-speed tracks, and the

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1. KONVEX Pads are fabricated from the finest truck tire carcasses—heavy-duty, multi-ply Nylon and Rayon cord.
2. Self sealing is positively assured with the Patented KONVEX Shape.
3. Patented KonKling adhesive on bottom of pad assures permanent tie seal.
4. KONVEX Pads are never affected by extreme temperatures.
5. Pads are prevented from sticking together through the use of Silicon slip sheets.

Compare WESTERN KONVEX Pads with any other pad manufactured, and you will discover that KONVEX is by far the superior. KONVEX Pads if made from new tire carcasses would cost $1.50 each, your cost is less than ⅓ of this figure.

Enlarged view of a section of WESTERN KONVEX Tie Pad shows the superior construction—multi-ply Nylon and Rayon cords—with KonKling adhesive.

WESTERN KONVEX TIE PADS have proven successful on

- Curves
- Paved Areas
- Bridge Decks
- Crossing Frogs
- Grade Crossings
- Insulated Joints
- Out of Face Installations
- on Welded Rail Laying

The normal life expectancy of the tie will double with the use of WESTERN KONVEX Pads. These savings are doubly important especially when based on today's cost of ties, and the high labor cost for installation.

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SEE—COMPARE the superior quality of the WESTERN KONVEX Pad—Write for Free Sample, no obligation.

Name_____

Railroad_____

Address_____

What's the answer? (cont'd)

economical field or shop repair of each.

The same basic economic factors apply to either railbound or solid-manganese frogs with one exception: Long flangeway cracks, until they cause transverse cracks, are not too dangerous in railbound frogs.

We feel that the factors governing the economical field repair of manganese turnout frogs are:

(1) Traffic conditions which should permit a minimum of five hours productive labor.

(2) Average head wear on frog should be less than 3/16-in.

(3) Fractured or broken-out areas should not be so large that, when ground out for welding, an unsafe track condition would exist.

(4) Guard rails on self-guarded solid-manganese frogs should not be worn over 3/16-in.

Explanation:

(1) Where traffic is very heavy, the loss in productive welding time, and the possibility of poor welding, would create an excessive cost. The economic method is to keep frogs properly ground (the importance of keeping a proper opening in the flangeway and the correct radius on point and wing rails cannot be overstressed). Then, when the frog is in need of repair, remove it from the track and repair at the shop.

(2) If the average head wear on a frog is 3/16-in or more, the entire running surface should be built up. With this amount of welding, warpage and good surface grinding becomes a problem. Therefore, the frog should be repaired in the frog shop.

(3) If fractured or broken areas are large enough to cause unsafe track conditions, a slow order would have to be issued. Also, the large holes must be filled in slowly to prevent overheating of casting. The cost involved from these two factors would be excessive.

(4) If a guard rail of a self-guarded frog has 3/16-in or more wear, the point must be equally worn. To rebuild the frog under traffic and prevent possible derailment, a proper welding sequence must be used. This entails continual runoffs, rebuilding the metal crushed out by car wheels, etc., causing slow welding and excessive costs.

Factors governing economical shop repair of manganese frogs:

(1) The casting should be materially sound, i.e., with no long flangeway cracks, long transverse cracks or complete breaks.

(2) Overall cost of frog repair will not exceed 40 per cent of new frog.

Explanation:

(1) Long flangeway cracks are practically impossible to weld successfully, because of locked-up stresses in the weld zone. Long vertical cracks, where they penetrate through the casting, are very costly to weld, and life expectancy is generally short. The life expectancy from broken castings does not warrant the cost of repair.

(2) To exceed 40 per cent cost of the cost of a new frog, an excessive amount of welding must be done on a frog. Life expectancy would then be short since one is in proportion to the other.

Biographical briefs (cont'd)

(Continued from page 10)

p. 10), joined the railroad as an instrumentman in 1951 at Port Arthur, Ont. Two years later he was appointed junior assistant engineer at Winnipeg. In 1954 he was promoted to assistant engineer at Kamloops, B. C., returning to Winnipeg in 1956 as assistant division engineer, the position he was holding at the time of his recent promotion.

Association News

Northwest Maintenance of Way Club

At the next meeting of the club, to be held on December 18, the program will be devoted to an address, accompanied by a moving picture, on the St. Lawrence Seaway project. The speaker will be Major Herbert H. Howard, executive officer of the United States Corps of Engineers, St. Paul District. The meeting will be held, as usual, at the Midway Civic Club, 1931 University avenue, St. Paul, Minn.

American Railway Engineering Association

The constitutional amendments providing for the creation, within the AREA Board of Direction, of an Executive committee were approved by a wide margin, according to Neal D. Howard, executive secretary of the association. The vote was 1407 in favor of the amendments and 41 against.

The purpose of the Executive committee is to act for the Board of Direction between regular board meetings on matters which, in the opinion of the Executive committee, cannot properly be delayed until the next Board meeting.

The personnel of the new Executive committee was announced by President B. R. Meyers (chief engineer, Chicago & North Western,) at a meeting of the Board of Direction held on November 7 at Urbana, Ill. With Mr. Meyers as chairman, the committee consists of Ray McBrian, the immediate past president of the association and director of research, Denver & Rio Grande Western; Frank R. Woolford, senior vice-president of the association and chief engineer of the Western Pacific; E. J. Brown, junior vice-president and chief engineer of the Burlington Lines; and G. H. Echols, a director of the association and chief engineer of the Southern System.

Other action at the Board meeting on November 7 included approval of committee personnel and subject assignments of all committees for 1959. Of more than

Association News (Cont'd)

ordinary significance is the fact that the Committees on Rail and Track, through new or revised assignments, were asked to give special attention looking to the standardization of rail sections and trackwork plans.

At a meeting of the Committee on Hotel Arrangements at Chicago on November 6 preliminary arrangements for the next convention were discussed. The convention will be held at the Hotel Sherman, Chicago, on March 9-11, 1959.

Supply Trade News

BUCYRUS-ERIE — Howard Freyensee, sales development manager, commercial cranes and excavators, has been appointed manager of sales, large excavators, with headquarters at South Milwaukee, Wis., succeeding **Lewis C. Black,** who has been appointed manager of domestic sales.

FAIRMONT RAILWAY MOTORS — Fred Sautter, assistant track supervisor on the Maine Central at Waterville, Me., has resigned to become a sales representative of this company with headquarters at New York City.

LETOURNEAU-WESTINGHOUSE — As the result of the establishment of a new Motor Grader Sales Department, effective November 1, a series of appointments has taken place in this company's Merchandising Division. **Lloyd A. Rager,** who has served as advertising manager for the past four years, has been named to manage the new department. **E. L. Cline,** central area sales manager for the firm since 1955, has been appointed assistant to Mr. Rager, and **Robert J. Fahey,** a district representative in the Midwest, succeeds Mr. Cline as central sales manager. **Charles L. Peterson,** assistant to the firm's western area sales manager, succeeds Mr. Fahey, as district representative in the territory which includes Iowa, Nebraska, Kansas and the western part of Missouri.

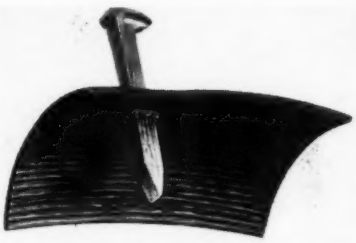
Kenneth W. Chriswell, assistant advertising manager since 1956, succeeds Lloyd Rager as advertising manager. **David R. Harvey,** sales promotion supervisor, succeeds Mr. Chriswell as assistant advertising manager.

Floyd A. Rager (twin brother of Lloyd), formerly technical parts manager, has been appointed general parts and service manager. This promotion was brought about by the merging of the firm's parts and service departments, according to an announcement by **L. A. DePolis,** vice-president in charge of the Merchandising Division.

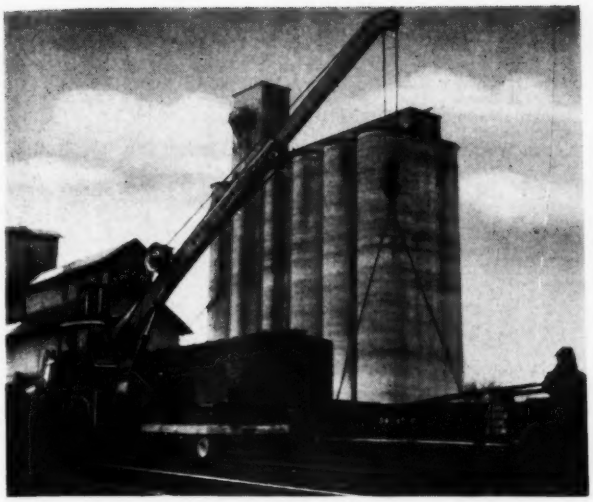
PORTLAND CEMENT ASSOCIATION — John M. McNerney, district engineer at Los Angeles, has been appointed western regional manager there, succeeding **Hugh D. Barnes,** who has been appointed to the new position of supervisor of field promotion with headquarters at the association's general offices in Chicago. In his new position Mr. Barnes will direct and have complete authority and responsibility for all operations of the association's 32 district and 6 regional offices.

RAILROAD ACCESSORIES CORP.—Harrison A. Scott, chief signal engineer for the New York Central at Cleveland, has resigned to become president of Railroad Accessories, with headquarters in New York, succeeding **Frederick C. Lavarack,** resigned. **Beverley A. Lundy,** executive vice-president, has retired.

WESTERN RAILROAD SUPPLY — This company, a division of Western Industries, Inc., Chicago, has been appointed by **A. Schulman, Inc.,** East St. Louis, Ill., as exclusive sales agent for the latter company's new Konvex tie pad. This patented tie pad is made from truck tire carcasses, fabricated from multi-ply heavy duty nylon and rayon cord and coated with KonKling adhesive.



KONVEX tie pads are made from carcasses of truck tires, and are coated.



This H-5 Hydrorailer uses precision control and telescoping boom to unload a signal tower in an Indiana railroad yard. On the back of the Hydrorailer is a clamshell, ready for quick attachment for digging jobs.

a section gang in itself...

BUCYRUS-ERIE'S NEW H-5 HYDRORAILER, ON AND OFF RAILS

JACK OF MANY JOBS

Placing Signal Towers	Loading Ties, Caps, Rails
Building Bridges	Laying Track, Switches
Grading Approaches	Stockpiling Ballast
Digging Ditches	Erecting Crossing Gates
Backfilling Material	Hauling Debris
Clearing Wreckage	Handling Concrete Buckets
Spotting Hand Cars, etc.	Picking Up Scrap With Magnet

MONEY-SAVING ADVANTAGES

One-Man Operation (Optional)	Commercial Truck Mounting
Precision Hydraulic Control	Hydraulically-Set Outriggers
Telescoping Boom	Easy Front-End Conversion
All-Hydraulic Power	Variety of Attachments
Power-Set Rail Wheels	Fast Between-Job Travel
12-ton, ½-yd. Capacity	Short Tail Swing

286H58

Your Bucyrus-Erie distributor wants to demonstrate the money-saving features of the new H-5 Hydrorailer.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

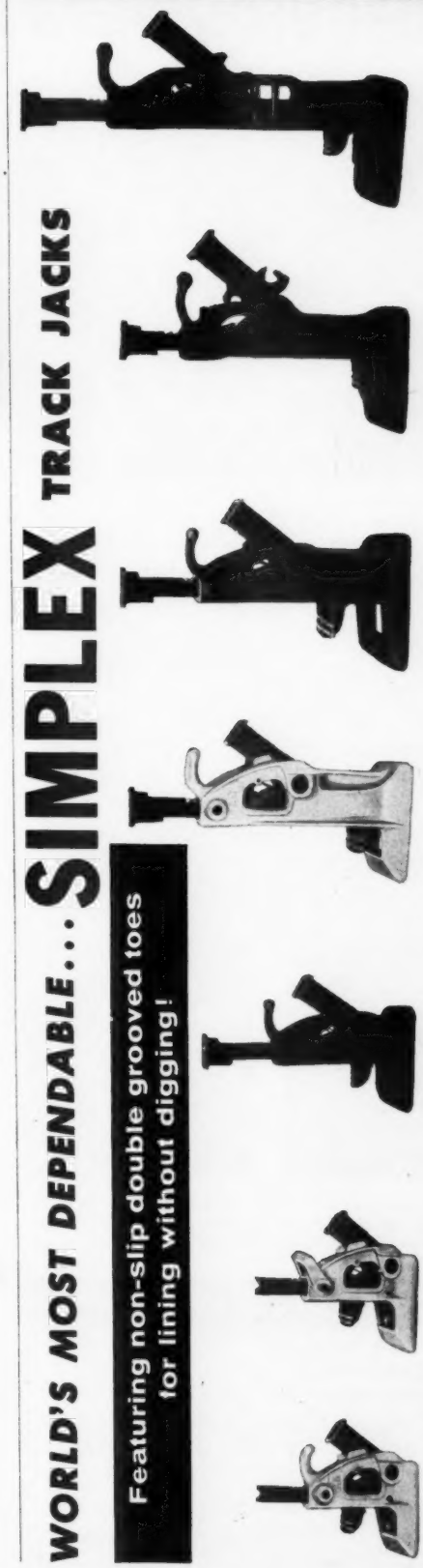
BUCYRUS ERIE HYDROCRANE

Over 50% of Hydrocranes sold last year were repeat sales

GET IN THE GROOVE!

WORLD'S MOST DEPENDABLE... SIMPLEX TRACK JACKS

Featuring non-slip double grooved toes for lining without digging!



- Most complete line — twelve models
- Available with malleable or aluminum alloy housings
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- Lifting ranges from 5 inches to 19¼ inches
- Thumb guards and trips on both sides
- Lowest toe height—less digging or pounding to set jack

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JOB: Move 1½ million cu. yd. for the Northern Pacific

WHEELED EQUIPMENT: 3 DW21s

RESULT: "We're on schedule because the DW21s have plenty of power and traction. They maneuver better than anything their size." Hugh G. King, President, Bud King Construction Co., Missoula, Montana

Big, fast-moving Cat DW21 wheel Tractors look their best on the tough jobs. This is one. Bud King Construction is moving 1½ million cu. yd. to relocate 19.5 miles of Northern Pacific line in Montana. When the job started, equipment was half under mud. Excavation included everything from rock to clay.

"I like the traction and flotation of the DW21s on this soft ground," says Mr. King. "We had them on clay slopes where any other machine would have either bogged down or been too awkward to handle."

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This is important new economy and production for the big, tough off-track jobs. Have your Caterpillar Dealer give you an eye-opening demonstration of the new DW21 on your next job. It's so fast, strong and efficient, it has to be seen in action to be believed.

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